Instilling positive attitudes to physical activity in childhood - challenges and opportunities for non-specialist PE teachers

Abstract

This English mixed methods study investigates the capacity primary (elementary) teachers have to lay a foundation for pupils' engagement in active lifestyles through the delivery of quality Physical Education. The outlook is not positive as the study reveals low self-efficacy rates in the sample's ability (n181) to teach quality PE, a lack of consensus around what underpins positive outcomes in PE and limited prioritising of established pedagogical strategies deployed effectively in other curricular areas. Although disappointing, glimmers of hope and inspiration are drawn from the best practice examples from 5 schools that provide evidence of a strong collective teacher efficacy towards PE. The study concludes PE is a force to mitigate health inequality with pragmatic suggestions offered to ensure primary teachers' sphere of influence is not wasted.

Physical Education, primary (elementary) teachers, collective teacher efficacy in PE, pedagogical principles, foundation for active lifestyles

Introduction

Obesity is one of the biggest health challenges facing England, with over a third of children (aged 10 or 11) leaving primary (elementary) schools classed as obese. Children who are obese stand a greater risk of developing cardiovascular and respiratory health conditions and type 2 diabetes. Obese children are also more likely to suffer social and psychological problems that can lead to low self-esteem, a negative self-image and depression, (Cale and Harris, 2013). 40–60% of obese school-age children in England become obese adults. The reasons for childhood obesity are complex and multifaceted with diet, eating patterns and physical inactivity all reported as contributory factors.

The positive correlation between physical activity in childhood and health is well known, with participation in regular physical activity widely recognised for its potential in helping to combat increasing childhood obesity and associated morbidity, across many parts of the world (World Health Organisation, 2011). For many children,

particularly those in families who do not encourage sports participation, the only opportunity to engage in organised physical activity presents in statutory education. Primary schools with the infrastructure to facilitate children's physical activity, have been highlighted as optimal sites to instil positive attitudes towards physical activity and lifelong healthy lifestyles (Irwin, He, Sangster Bouck, Tucker and Pollett, 2003; Jess, Dewar and Fraser 2004; Petrie and Lisahunter, 2011). A number of studies support the growing belief that healthy life habits are formed much earlier in life than was originally thought, with the primary, rather than secondary schools years, now regarded as the crucial stage for the formation of an enduring attachment to sport (Birchwood et al. 2008; Haycock and Smith, 2012; Wheeler, 2017). Roberts (2016) argues, the vast majority of young people enter the post-child life stage with foundations in sport already laid.

One of the aims of the English National Curriculum for physical education is in fact to ensure that all children lead healthy and active lifestyles, the other aims are to develop competence to excel in a broad range of physical activities, to be physically active for sustained periods of time and to engage in competitive sports and activities. Advocates of primary PE highlight the positive contribution it can make to a number of realms, including children's physical, emotional, social and academic development (Bailey, 2006; World Health Organisation, 1995; Morgan and Bourke, 2008). Other supporters of the subject are keen to point out however, that PE can only achieve such positive outcomes if appropriately designed and delivered, (Tsangaridou 2012, Bailey, Kirk, Jess, Pickup and Sandford, 2009).

The catalyst for this mixed method study is the collection of international research papers, presented in the 2016 Special Edition of Education 3-13, 'Contemporary Issues in International Primary Physical Education'. Framed as a global

snapshot of primary Physical Education, the featured papers expose the raft of complex issues perceived to hinder professional development and effective teacher delivery in this field. The study presented in this current paper contributes to the relatively limited research base by providing fresh empirical evidence that sheds light on the contemporary reality of primary PE in England. In the current context of global pandemics, where those with underlying health conditions present at higher risk, the quality of PE received is more important than ever due to its potential as a vehicle to lay a foundation for engagement in healthy and active lifestyles. The overarching aim of the study is to explore whether the subject of primary Physical Education has progressed since the global snapshot presented in 2016, and is now better positioned to realise its potential in impacting positively on children's lifestyles or whether progress here may still be compromised.

Literature review

Barriers to teaching primary PE

Primary teachers play a central role in delivering PE, yet in the past, low levels of confidence and competence to teach PE have been reported, (Faucette, Nugent, Sallis and McKenzie, 2002, Morgan and Bourke, 2008) with studies highlighting primary teachers' uncertainty about what they are meant to be doing in this subject, (DeCorby et al., 2005; Hart, 2005; Lynch, 2015). Although PE in primary schools can be taught by PE specialists, international research suggests that the responsibility for its planning and delivery usually lies with the primary class teacher or generalist, (Hardman, 2008, Lu and DeLisio, 2009). Such non-specialist teachers will typically teach a number of other curricular subjects and will not likely have undertaken extensive training or have an undergraduate degree in PE. PE has traditionally been viewed as one of a number of non-core or foundation subjects within the primary or

primary curriculum, with concerns often raised about its propensity for marginalisation and lower status in comparison to other academic subjects (Shaughnessy and Price, 1995; Warbuton, 2000; Stylianou, Hodges Kulinna, and Naiman 2016).

Research conducted by Morgan and Hanson (2008), found that although primary teachers recognised the inherent value of PE, they generally preferred and felt more confident to teach other subjects due to a perceived lack of personal knowledge and ability in this specific area. The challenges and difficulties of teaching the subject as a non-specialist are well documented (Graham, 1991; Morgan and Bourke, 2008, Murphy and O'Leary, 2012). Reported barriers to teaching primary PE include: inadequate facilities and equipment; low levels of teacher confidence, lack of secure subject knowledge, inadequate training at ITE level (Harris, Cale and Musson, 2012) and a legacy of the teachers' own negative experiences as students of PE, (DeCorby, Halas, Dixon, Wintrup and Janzen, 2005, Hardmann and Marshall, 2001). Interestingly, Quarmby et al's 2018 study found that some of these barriers existed in relation to any lesson incorporating physical activities. For example, as well as concerns relating to teacher confidence and competence and limitations over physical space, other reported barriers included preparation time and resources and school cultures influenced by governors and parents that reinforced a didactic pedagogical approach.

The need for quality professional development to support the teaching of primary PE has frequently been raised by researchers who problematise the limited opportunities non-specialist primary teachers have to develop confidence and expertise to teach the subject (Harris, Cale and Musson, 2012). Inadequate and inappropriate preparation has been identified as the major barrier for primary generalists to develop and implement a quality physical education programme (Lu and DeLisio, 2009). The

primary PE literature suggests that primary teachers may well be disadvantaged from the outset of their career due to the minimal training received in PE on initial teacher education (ITE) or pre-teacher service (PTS) courses. A UK survey conducted by Caldecott, Warburton and Waring in 2006 found that on average only 9 hours of taught contact time was provided during an ITE course. This non ideal start is exacerbated by subsequent ineffective in-service professional development opportunities (OfSTED, 2005).

Investment in PE

In England concern around the ineffective delivery of PE in primary schools has existed for some time, (Warburton 2001; Griggs, 2007). Such concerns precipitated the introduction of two major national strategies, designed to enhance the quality and quantity of physical education and school sport at a national scale. The first strategy, introduced in 2002, known as the Physical Education, School Sport and Club Links, (PESSCL) invested over £1.5 billion, with the aim of enhancing the take up of sporting opportunities for 5-16-year-old pupils. PESSCL was underpinned by a pledge to engage all pupils in at least 2 hours of high-quality Physical Education and sport at school each week (DfES/ DCMS, 2003). In 2008 the expectation increased to a new '5-hour offer' and was accompanied by an extra £3/4 billion funding, and a new infrastructure or network, known as the School Sport Partnership (SSP) programme. Each SSP comprised a specialist sports college that acted as a hub, linking to a small number of secondary schools and their respective feeder primary schools. By 2011, against a backdrop of public sector austerity cuts, the funding for the SSP was scaled back considerably, resulting in an increasingly fragmented and largely dismantled support network, with further concern expressed that primary PE would be the main losers from this policy transition, (Mackintosh, 2014).

In March 2013, in the wake of the 2012 Summer Olympic and Paralympic Games in London and the UK government's legacy commitments to inspire a generation of young children to be more physically active, another PE policy initiative was introduced. Known as the Primary School PE and Sports Premium (PSPESP), jointly funded by the Departments for Education, Health and Culture, Media and Sport, and ring fenced until 2020, all primary schools in England initially received funding of £8000 per primary school, plus a premium of £5 per pupil. This funding, paid directly to primary schools, was doubled in 2017. The government requires schools to invest the funds wisely to ensure sustainability, for example, upskilling teachers to deliver high quality PE and sport activities for all children. In 2019, the School Sport and Activity Action Plan was launched with the ambition of providing all children with the opportunity to participate in physical activity for at least 60 minutes every day; at least 30 minutes should take place in school and the remaining 30 minutes outside the school day. This plan was aligned to the national ambition to half childhood obesity rates by 2030 and significantly reduce the gap in obesity between children from the most and least privileged backgrounds, as set out in Childhood Obesity: a plan for action, Chapter 2 (2018).

Children's entitlement to participation in quality Physical Education is enshrined in UNESCO's 1978 International Charter of Physical Education and Sport, which defines quality Physical Education (QPE) as the planned, inclusive learning experience that forms part of the curriculum ... QPE acts as the foundation for lifelong engagement in physical activity and sport.' Unfortunately the latter goal falls short of the findings of a study conducted by Parry 2013, which suggests that PE in primary schools can actually have a negative impact on the physical recreational choices taken outside of school, particularly if too great an emphasis is placed on competition, performance and

the encouragement of peer comparison, to the detriment of children's enjoyment. Furthermore, investigations conducted by Cardinal et al. (2013) and Allender et al. (2006) report adverse experiences in PE can actually have a lifelong negative impact on participation in physical activity. It would therefore be prudent to qualify the claim that teachers of primary PE can lay the foundations for lifelong engagement in healthy, active lifestyles, 'providing' they facilitate enjoyable, inclusive learning experiences that enable all pupils to achieve positive outcomes. This study sheds light on this critical goal by investigating teachers' pedagogical understandings and efficacy in this domain.

Research Design and Data Collection

The mixed methods study described in this paper has three core aims. Firstly, it examines primary teachers' perceptions of self-efficacy in relation to their ability to teach a quality PE lesson. According to Bandura's Social Cognition Theory (1997), the construct of self - efficacy relates to how well someone feels they can carry out a role; in the case of teachers it has been linked to productive teacher behaviours and positive student outcomes. The study seeks to establish whether gender, the number of years of teaching experience, the size of their school and the student: staff ratio have any bearing on the self-efficacy ratings. The associated research questions are: How does a sample of 181 primary teachers self-rate their ability to teach high quality PE? What patterns, if any, emerge from the participants' responses? The premise here is that engagement in quality PE will increase the likelihood of children developing positive attitudes towards physical activity.

Secondly, on the basis that teachers' perceptions and beliefs affect their practice and in acknowledgment of the link between understanding teachers' belief systems and improvement in teaching practices, the study aims to gain insights into teachers'

perceptions of what underpins successful outcomes in PE. The aim is to establish if a shared understanding exists between the teachers of the pedagogical content knowledge (PCK) required to enable and promote learning in PE (Shulman, 1986). The associated research question is: Do the sample of primary teachers have a shared understanding of what underpins successful outcomes in PE? Inspiration is drawn from Petrie (2010) who advocates professional learning opportunities that allow for the transfer of tried and tested pedagogical skills and strategies from the classroom to PE. An example of a generic pedagogic practice is assessment for learning (AfL); a process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there, (Assessment Reform Group, 2002:1). This process is formative in nature with the potential to shape teaching and learning by responding to the specific needs of children for example, through the subsequent provision of differentiated activities. Other related examples include the sharing of lesson intentions and success criteria with the scope for pupils to practice and evaluate their learning and that of their peers. The study seeks to find out if these key pedagogical principles feature in the teachers' views on what underpins successful outcomes in PE or whether as (Schaefer et al., 2017) problematize, such practices may be overlooked on the grounds that PE is not an academic subject. The premise here is that an 'absence of knowledge from other pedagogical strategies' (Ward, 2013: 582) may limit the scope to meet the learning needs of the pupils, potentially compromising the chances of developing positive attitudes towards physical activity.

Thirdly, a representative from the schools in the sample that have the highest mean in their self-ratings (top 10%) are interviewed with the aim of establishing what characterizes their approach, if any, to PE. The associated research questions are: What

characterizes the approach to PE in those schools in the sample where teachers feel most able to teach quality PE? Are there commonalities across these schools? In order to capture a rich and in depth picture of the context of PE in each of these schools, the interviewees are asked a range of questions, for example, about the status and purpose of PE and staff attitudes to the subject, as well as details about the whole school infrastructure, leadership, professional development opportunities, curriculum and accountability processes for PE.

The 181 teachers from 18 schools that participated in the study all belonged to an established ITE partnership with the researcher's university in the south west of England and as such, constituted a convenience sample. The schools served a range of communities with low and middle socioeconomic status. The data collection was carried out in two phases over a period of 18 months. Although the research is located in England, many of the themes and issues raised, as well as the conclusions drawn, have international relevance for all those interested in improving primary PE and its scope to lay a foundation for engagement in healthy and active lifestyles.

Phase 1 of the research

Head teachers of 50 schools were initially contacted via email inviting them to participate in the study. Details were provided about the context and aims of the research, along with a copy of the survey to be administered to the teaching staff. The head teachers who agreed to take part were sent hard copies of the survey, an information sheet and consent form for each participant, along with a stamped addressed envelope to return them. It was made clear that teachers' participation was on a voluntary basis and that all responses would be anonymised. Participants were asked not to collaborate when completing the document and to not share their answers with

others. The sample had a fairly evenly balanced representation from small, medium and large schools serving rural, semi-rural and urban communities, with a mixture of low and middle socioeconomic status. Table 1 (Appendix 1) provides further details of the characteristics of the schools (such as size and staff to pupil ratio) and the number of questionnaires returned. Although the sample consisted mainly of females, approximately 80%, this is broadly representative of the primary teaching profession in England. The details of the participants in the sample are provided in Table 2.

Table 2: Characteristics of the sample

All Participants (n = 181)		Number	%
Gender	Male	36	19.9
	Female	145	80.1
Number of years Teaching Experience	2 years or less	23	12.7
	3-5 years	39	21.5
	6-10 years	38	20.9
	More than 10 years	79	43.6
	Prefer not to say	2	1.1

The research instrument for Phase 1 of the research was a survey questionnaire with three questions. Question 1 asked the participant to respond to the statement, 'I feel able to teach a quality PE lesson' by highlighting one of the following: strongly disagree disagree not sure agree strongly agree. This question was designed to scope the teachers' self-efficacy, to help establish whether a problem still exists in the

area or whether progress has been made in light of increased funding from the PE Premium.

Question 2 asked the participants to think of a quality PE lesson they had either taught, observed or planned to teach and to list the three key ingredients or principles within the teaching they felt would underpin successful outcomes. To avoid a potential 'straightjacket of prescribed answers', (Gillham 2007 34), the participants were not given a set of predetermined responses to rate in order of importance. Instead, the question was deliberately open-ended to probe each teacher's individual beliefs and understandings. Although this approach is more likely to generate a number of outliers that reflect a variety of personal and individual preferences, the intention is to establish if there is evidence of a consensus around a core knowledge base or whether teachers adhere to a wide variety of beliefs about what underpins successful outcomes in PE. Question 3 asked for contextual details such as their gender, the number of years they had been teaching. Further contextual details relating to each school, such as the number of pupils on roll and the number of full-time teachers were extrapolated from external sources such as the school's website or recent inspection reports from the schools' inspectorate OfSTED, that are available on line.

Data Analysis

Based on the data from the survey, a regression analysis was used to identify what factors, if any, influence teachers' self-efficacy ratings. This method tells us the direction and strength of relationships between variables; both how the variables are related and how much they are related, (Punch, 2009:270).

Dependent Variable:

- Self-efficacy ratings were allocated a Likert answer scale, grading from 1 for 'strongly disagree' through to 5 for 'strongly agree'.

Independent Variables:

- Experience - in the survey, years of experience received in increments with 0-2, 2-5, 6-10, and more than 10 years of experience were coded as 1, 2, 3, 4 units of experience respectively
- Size of School (number of pupils)
- Staff to Pupil Ratio
- Gender: a dummy variable was introduced, which equals 1 if the respondent was female and 0 if the respondent was male.

For Question 2 an open-ended inductive coding method was used to organise and reduce the data. All the responses were analysed and organised into 23 emergent categories or themes that represent the response. This initial list was further reduced into 18 categories by looking for similarities or potential repetition between themes that could effectively be classified together as one overarching data theme. Once the emergent themes could not be reduced down any further, the total number contributing to each distinct theme was recorded, along with the percentage for each category. The percentage for each response was calculated out of the total number of participants (n181). Responses that align with AfL principles are denoted by an asterix.

A total of 6 out of the 18 schools scored a mean of 3.9% or above in the teachers' self-efficacy ratings to teach PE. These schools were contacted by the researcher by email and invited to participate in the second phase of the research. Of these 6 schools, 5 agreed to be interviewed. Each participant took part in an individual semi-structured interview over the phone for approximately 45 minutes. The data gathered from the interview were analysed using principles of Grounded Theory, (Charmaz, 2006). The analysis involved the systematic collection and analysis and coding of data and finally the identification of key themes or categories that emerged.

The sub-headings in the Findings represent the themes that emerged, the participants are identified by their role and a number reflecting their position in the sequence of interviews.

Findings

Question 1

The data presented in Table 3 represent the responses of the teachers to the question 'I feel able to teach a quality PE lesson' in relation to the independent variables gender and number of years teaching experience. See table 2 for the characteristics of the sample.

Table 3: Survey data for Question 1 'I feel able to teach a quality PE lesson'

Response	All Sample (%)	Gender (%)		Years of Teaching Experience (%)				
		Female	Male	≤2	3-5	6-10	>10	did not say
Strongly Disagree	2.2	2.1	2.8	4.8	5.3	0	1.3	0
% of whole cohort	2.2	1.7	0.6	0.6	1.1	0	0.6	0
Disagree	6.1	6.9	2.8	14.3	10.5	3.0	2.5	1.1
% of whole cohort	6.1	5.5	0.6	1.6	2.2	0.6	1.1	0.6
Not sure	23.2	24.8	19.4	42.9	23.7	18.2	18.8	33.3

% of whole cohort	23.2	19.9	3.9	4.9	5.0	3.3	8.3	1.7
Agree	53.6	53.1	55.6	38.1	52.6	63.6	55.0	44.4
% of whole cohort	53.6	42.5	11.0	4.4	11.0	11.6	24.3	2.2
Strongly Agree	14.4	11.7	25.0	0	7.9	15.2	21.3	11.1
% of whole cohort	14.4	9.4	5.0	0	1.7	2.8	9.4	0.6

Table 4 reports the results of the regression exercise and the concomitant t-tests for significance.

Table 4: Regression 1 Results

Coefficient	Estimate i	t - value	p - value
Intercept	2.82 (0.38)	7.515	0.00***
Gender	-0.22 (0.15)	-1.456	0.136
Experience	0.19 (0.05)	3.695	0.000***
Pupils	-0.00 (0.00)	0.000	0.226
Pupils: Staff	0.03 (0.02)	2.081	0.039*
F - test	5.367		0.000
Adjusted R-squared	0.088		

The p-values indicate that gender and the size of the school (pupils) are insignificant at the 5% level. These variables were therefore excluded and the regression conducted again in order to obtain more accurate estimates of the effects of the remaining significant variables on teachers' self-efficacy ratings. It was also found that the staff: pupil ratio became insignificant when these variables were removed, leaving a single significant variable. The results are displayed in Table 5 below.

Table 5: Regression 2 Results

Coefficient	Estimate i	t - value	p - value
Intercept	2.95 (0.18)	16.58	0.00***
Experience	0.26 (0.06)	4.60	0.00***
F - test	21.11		0.00***
R-squared	0.101		

This analysis suggests that an additional 'unit' of experience as defined previously will increase the rating given by a respondent by 0.26. Thus, it can be concluded that increased years of experience will increase the teachers' self-efficacy rating on their ability to teach a quality PE lesson. However, the R-squared value is relatively low at 0.101 indicating that experience is only able to explain 10% of the variation in ratings given. This analysis finds that gender, the size of the school and the staff: pupil rating has no significant impact on teacher's self-efficacy ratings.

Question 2

Table 6 shows the range of responses offered that were categorised into 18 different themes with the respective percentages shown. The most frequently cited response 'Clear modelling with simple and clear instructions' was offered by 41.9% of the participants, followed by 'Enjoyment and engagement' at 34.8%. Over 50% of the individual themes were chosen by fewer than 10% of the sample with 'Pupil choice' only cited by one person. The most frequently cited AfL strategy was opportunities for skills progression (30%), followed by differentiation and inclusion (28.1%), lesson objectives established and shared (22%), opportunities for feedback (12.1%), opportunities for intervention (4.9%), with pupil choice (0.5%) the least frequently cited AfL strategy.

Table 6: Responses to Q 2 - three key ingredients or principles that underpin successful outcomes in PE

Theme (* AfL strategy)	n	%
Clear modelling with simple and clear instructions	76	41.9
Enjoyment and Engagement	63	34.8
Opportunities for skills progression*	55	30
All children active	54	29.8
Differentiation and inclusion for all*	51	28.1
Lesson objective established and shared *	41	22
Well structured lesson	31	17.1

High quality resources available	27	14.9
Opportunities for feedback (teacher/ peer to peer)*	22	12.1
Physiology/ links to health	15	8.2
Underpinned by subject knowledge	13	7.1
Good behaviour management	12	6.6
Teamwork promoted	11	6.0
Opportunities for intervention*	9	4.9
Sense of achievement gained at the end of the lesson	7	3.8
Risk taking opportunities /building confidence	6	3.3
Teacher enthusiasm	6	3.3
Pupil Choice*	1	0.5

Findings of Phase 2

High Status of PE

All five interviewees described the status of PE within their school as high; two participants rated it as the most important curricular subject, with the remaining participants ranking it as the third most important subject after numeracy and literacy. The majority of the interviewees attributed its high status to the critical mass of staff within each school who shared an appreciation of the inherent and holistic value of PE

and physical activity. All respondents described how in contrast to other foundation subjects, PE was a 'protected' subject that was not dropped or missed when timetables got 'busy'. The following extract illustrates the relatively higher status of PE, compared to other foundation subjects, described by one participant:

> Timetables often get squashed because of events, bank holidays or illness; lessons such as history, geography, art, French, DT, sometimes something has to go but PE is not one of them. (Head Teacher, 3)

Although respondents acknowledged that the subject was not prioritized by the Schools' Inspectorate Ofsted, the majority of participants highlighted their school's use of robust accountability systems to enable monitoring of children's progress and to inform intervention programmes.

4 out of 5 respondents highlighted the importance of 'senior leader buy in' as a means of raising the status of and expectations for PE. For example, one participant described how all teaching staff were provided with a hoodie and expected to change into their PE kit for PE lessons. All participants highlighted the importance of appropriate resourcing for PE, for example, describing how for each PE lesson, sufficient equipment had been purchased to ensure there was, for example, one football, basketball or netball per child. Another interviewee highlighted the importance of strategic planning to ensure sufficient resources were in place. He explains:

> We've got an infrastructure here, which is really important and schools have got to understand that you've got to dedicate a considerable amount of budget to PE....if you want to deliver a proper, decent quality, highly effective PE lesson, firstly you need the right equipment. (Head Teacher, 2)

The importance of investing in equipment for PE is echoed in the following comment:

> I have spent significant amounts on equipment to ensure there is adequate equipment and the opportunity for each child to use it (Subject Leader, 5)

In addition to subject leaders and the senior leadership team, participants described how the subject was valued and advocated by other colleagues, who played key roles in championing or 'flying the flag' for the subject, as well as supporting other colleagues, for example,

> We've appointed a PE champion for each year group and divided it into sections so we did cricket, ball skills, netball and dance. They all split into three groups so they were then the experts in those subjects so they could liaise with their colleagues and model. Each year group has somebody who is very passionate about PE luckily (PE Subject leader, 1)

One participant described how their school's approach to teacher recruitment was biased towards potential advocates or champions of PE; with an interest in physical activity included in the teacher selection criteria. The rationale for its inclusion is explained below:

> I don't want it to sound like we only employ Olympic champions, that's not true. In our shortlisting process one of the many criteria is that they are involved in sports or some sort of physical activity that they regularly do. If you employ these sorts of people, they have a mindset, they understand the importance of physical health so they would buy into it. (Head Teacher, 2)

Each participant contextualised their school's PE provision within the holistic goal of seeking to promote pupils' health and well-being through encouraging a positive attitude to physical activity and sport. 4 out of the 5 respondents made specific reference to their awareness of local and national data on childhood obesity and identified physical activity as an ideal vehicle to combat increasing obesity, as well as mental stress and anxiety.

> I think PE is the most important subject because I think physical wellbeing should come before anything. I think that obesity levels of children at the moment are going up and up and up and it's scary to think what will happen in 30 to 40 years' time in terms of children's health ...the next generation's health. (PE Subject Leader, 1)

All schools within the sample gave a number of illustrative examples of the range of opportunities available for members to be physically active beyond PE lessons. These included a number of extracurricular clubs, offered at lunchtime, before and after school, as well as whole school activities such as 'Wake and Shake' and running the golden mile on a daily basis. One school set the expectation that all children would take part in a minimum of one physical activity club, with over 20 different sports clubs to choose from. Three of the schools had regular physical activity sessions for staff to attend.

Continuing Professional Development (CPD)

Although some of the PE lessons were taken by external specialist PE coaches, all participants reported that all their teachers were expected to teach the majority of their own PE lessons. All interviewees recognised the value of continuing professional development, with the approach taken to support teachers to teach PE, broadly similar

across the 5 schools. For example, whilst not receiving as much attention as core subjects such as maths and literacy, regular staff development time was dedicated to the subject. The majority of the respondents highlighted their practice in team teaching in PE and described how this form of CPD helped to raise teachers' confidence to teach the subject. One participant recognised that some colleagues were confident to teach some aspects of PE but not all aspects. She described their school's practice in auditing the teachers' confidence in the different dimensions of PE in order to provide targeted support, as explained here:

> We give the teachers audits on what they are least confident to teach. I will then team teach and work alongside them. Observations as well. We're on a very easy-going level where I am able to tell teachers where they can develop and show them as well.
>
> (PE Subject Leader, 4)

Most of the interviewees described how their CPD in PE was carried out in situ rather than 'sending colleagues off on external courses'. This approach was preferred as it gave opportunities for the staff to collaborate and contextualise their learning, as evidenced in the following comment:

> Doing it together is important, so we're able to talk about it as a staff group and what what the implications are, it's very powerful and better than one person going off on their own to do a course (Head Teacher, 3)

Respondents were asked directly whether there was a shared understanding amongst the teachers of what constitutes quality PE and to provide evidence to support their

stance. All respondents were affirmative with supportive illustrative examples, as exemplified here:

> Yes we do have a shared understanding and I know that through communication. I know it sounds really basic but you need communication... We share practice and team teach, things like that. That helps us be assured that teachers know what they're doing and understand where they are going with their PE lessons
>
> (PE Subject leader 4)

Discussion

In spite of considerable investment in Physical Education and Sport in England since 2002, a significant percentage of primary teachers in the sample still reveal low self-efficacy ratings in relation to their PE teaching, with 31.5% unable to agree or strongly agree with the statement they feel able to teach a quality PE lesson. Whilst there is no significant difference in the variables: gender, the pupil: staff ratio and the size of the school, there was a statistical difference in relation to the years of teaching experience. The data show those newest to the profession feel the least able, with 62 % of those who have been teaching for 2 years or under, unable to agree, or strongly agreeing with the statement. The low self-efficacy ratings for this particular group could be attributed to a number of inhibiting factors reported in the literature. They could also be linked to the fact this group of teachers have simply had less practical experience teaching PE on which to build and progress the necessary skill set, knowledge base and expertise in this area. Another explanation can be drawn from the work of Morgan and Bourke (2008) who report on the adverse impact, negative memories from one's own PE lessons as a pupil, may have on a teacher's confidence and subsequent teaching behaviour in PE. A potentially negative autobiographical base

may well exert a greater influence on those newest to the profession due its closer proximity and the more limited scope available to build a robust repertoire of positive professional learning experiences with which to counter, challenge and distance oneself from any negative source. Although the size of the school and the pupil: staff ratio makes no statistical difference to the teachers' self-efficacy rating, the data show some schools within the sample achieved a higher mean score than others.

A subsequent investigation of the approach to PE and physical activity within each of the 5 featured schools highlights a number of commonalities. In broadly similar ways, these schools recognised the inherent and holistic value of PE and crucially, gave concrete illustrative examples of the strategic leadership, infrastructure and professional support in place to help staff to facilitate positive outcomes. The PE subject leaders and other champions of PE worked collaboratively to support and scaffold teachers to build confidence and expertise to teach PE, for example, through team teaching and the provision of regular in-house CPD. The practices are indicative of a climate that legitimizes help seeking and joint problem solving (Ross, Hogaboam-Gray, and Gray, 2004) and highlights the importance of a positive school culture.

The deconstruction and analysis of the schools' approaches towards PE in the context of a supportive community of practice, points to the presence of collective teacher efficacy (CTE). Closely aligned to self-efficacy, CTE refers to the collective perception that teachers make an educational difference to their pupils, (Tschannen-Moran and Barr, 2004). CTE, a group attribute or social norm, has been found to exert a strong influence on a school, influencing attitudes, affective, motivational and behavioural aspects of teacher functioning within the school. Typically studies of collective teacher efficacy focus on the impact it can have on pupils' academic outcomes. Schools with high collective teacher efficacy work proactively to address

social injustice; they do not accept low student achievement as an inevitable by-product of low socioeconomic status, lack of ability, or family background, (Tschannen-Moran and Barr, 2004). The data presented in this study illuminate what high CTE looks like in the non-academic subject of PE, offering a source of information and inspiration for those who are keen to improve their school's PE provision for all children.

The analysis of the teachers' perceptions of the key ingredients or principles that underpin successful outcomes in PE offers insights into the wide variance of perspectives that exists within the sample. The large number of themes that emerged, 50% of which were distributed in the form of a long data tail, with limited clustering around a smaller number of themes, points to a limited consensus or shared understanding amongst the majority of the teachers. The findings present a potential cause for concern; as Robinson and Timperley (2007) report, to achieve positive pupil outcomes, teachers need 'a realistic vision' to work towards. The lack of consensus or shared understanding could mask uncertainty or even confusion, potentially contributing to the low self-efficacy ratings reported.

Whilst it is encouraging that 34.8% of the teachers cite enjoyment and engagement in their responses, a particular concern lies in the low percentage of teachers who cite AfL strategies. Such practices are regarded as key professional skills for teachers, (Assessment Reform Group 2002) and yet for example, the opportunity for intervention is only mentioned by 4.9% of the sample and differentiation by only 28.1%. This begs the question whether a PE lesson can be enjoyable and engaging for *all* children if differentiated elements are absent. Without differentiation, or parallel activities, ideally co-designed by the children to match their needs, the lesson potentially becomes an imposed 'a one size fits all design'; a pedagogical model, which might lead to a lack of engagement or enjoyment by those who find the learning either

too easy or too challenging. Without opportunities to receive personalised intervention to support progression, children's learning in PE may well be further compromised.

Until early 2000, AfL was a relatively unknown pedagogical strategy although of course, elements would have been included in a teacher's toolkit. We might reasonably assume that a number of those in the sample took part in PE lessons that were designed with limited or no AfL features. As reported in the literature, with limited PE input in preservice courses, coupled with ineffective CPD, there is a genuine risk that teachers will draw on their own experience as a frame of reference when teaching PE.

Another associated AfL tool is the provision of pupil choice that allows opportunities for self-direction and the development of autonomy. Interestingly out of the sample of 181 teachers, only one teacher included pupil choice, compared to the 29.8%, who cite 'all children active'. Physical activity is promoted by governments across the world; indeed one of 4 aims of the English National Curriculum for PE is that children are physically active for sustained periods of time. It could be that respondents may have been affected by the concept of responder bias, choosing to quote from the National Curriculum in an effort to state what is socially acceptable. However, in spite of the emphasis placed on physical activity, it is important to remember that PE stands for Physical Education. If too much value is placed on the promotion of physical activity, rather than on children's learning in PE lessons, then short gains such as an increase in physical and cardiovascular fitness and muscular strength, may well compromise long term gains such as the development of intrinsic motivation necessary to engage in healthy and active lifestyles.

In order to highlight further the critical role AfL strategies play in providing a foundation for lifelong healthy and active lifestyles, it is helpful to draw on insights from the growing body of researchers who advocate the application of neuroscience to education; also referred to as the Science of Learning (SoL) (Howard Jones ,2020). We now know children's brains are pliable and can be moulded; neural pathways and networks can be strengthened and even rewired in response to experiences, both negative and positive. According to approach motivation theory (Lang and Bradley 2008), humans are naturally inclined to go towards positive stimuli. A quality, inclusive PE lesson where each child is enabled and empowered to progress in their learning and, importantly, experience success, is an example of an external stimulus that might strengthen inclinations, whilst influencing positively a brain's microstructure. If we want children to approach physical activity in a positive way and to embed it into their subsequent lifestyles, then it is imperative that their early engagement with PE is as positive as possible. Consideration of how to tap into children's wider interests and to use these to hook children is important. When PE teachers create learning environments that stimulate personal interests, then intrinsic motivation, engagement and learning are enhanced, (Standage et al., 2006). Setting a child centred team challenge for example, such as how to escape from a velociraptor in a jungle will enable children to develop agility, running, jumping, teamwork, resilience and communication skills, without them necessarily realising it. Most importantly, it is a suitably engaging point of entry to the learning, with which to inspire and motivate the children.

Another useful source of information with implications for primary PE teachers lies in the research around mirror neurons. First discovered by Rizzolatti and Craighero (1994) in the early 1990s with monkeys, with evidence of their existence in humans found around a decade later, (Mukamel, 2010), mirror neurons essentially give rise to

unconscious imitational and resonating behaviour. An example might be contagious yawning or smiling where neurons are found to fire both when an action is executed and when it is observed. Mirror neurons are believed to have a major influence on our social lives, as they seem capable of making us unconsciously mirror other peoples' body language, facial expressions and emotions, (Rizzolatti and Craighero 2004). Only 3.3 % teachers considered teacher enthusiasm as a key principle. If the level of enthusiasm a teacher has towards a subject is mirrored by the pupils then there is a danger that teachers' negativity towards the subject may be perpetuated, compromising further the long-term gains. Teachers can be powerful PE role models. Children deserve an enthusiastic and inspirational PE teacher. Simple choices such as how teachers dress to deliver PE and their body language throughout the lesson can convey clear messages on the value they attribute to the subject.

Conclusion

This study has revealed evidence of primary teachers' low self-efficacy with regard to their PE teaching and a lack of consensus amongst teachers about what underpins positive outcomes in PE for children; this does not bode well for the future health of our children, particularly for those children who rely entirely on their school for their sports participation. Whilst we know that schools do not exist in a vacuum and that many children have their sporting repertoires developed by their families, Roberts (2016) , it is recognised that primary teachers through the vehicle of PE are in a position of influence and are well placed to promote positive pupil attitudes toward physical activity and as a consequence, to lay a foundation for lifelong healthy and active lifestyles. In the current era of increasing childhood obesity, exacerbated by concerning levels of children's physical inactivity this study therefore reveals a deeply worrying picture, given the current context of global pandemics where those with underlying

health conditions present at greater risk. Whilst the sample is small, the study raises questions about the current professional capacity our primary schools have to genuinely lay this critical foundation. The aim of the study was to explore whether progress has been made in this field since 2016; the data suggests significant challenges remain for teacher education, both initial and continuing.

Although Covid 19 has wrought global devastation, a positive effect of the pandemic lies in the fact it has brought into sharp relief the critical importance of developing a foundation for healthy and active lifestyles. This is particularly important for those children from the underclass who lack the financial or social resources to engage in extracurricular physical activities beyond the school gates. As Wheeler et al's 2017 study reveals, these children are almost entirely dependent upon school provision for their sport participation, in contrast to the wide range of opportunities available to their more affluent peers. We cannot allow inequality to grow, particularly health inequality; it is therefore imperative to capitalize on the positive effect of Covid 19 and to channel our energies into raising the status and profile of PE in all primary schools and to have a renewed focus on the subject. The stakes are simply too high and the human costs too great for PE to remain a 'Cinderella' subject. Although the study paints a fairly bleak picture, there are nonetheless glimmers of hope, drawn from the five schools' CTE towards PE. These schools attribute high status to PE and importantly, have accountability processes, the infrastructure and professional support for staff to substantiate its high standing. Whilst academic subjects such as maths and literacy have typically been seen as the key vehicles to address disadvantage, now more than ever, space needs to be made on a school's social justice agenda for PE. By laying a foundation for a healthy and active lifestyle, PE earns its place as a major force to help mitigate social injustice; teachers must not let their sphere of influence be wasted. The

cycle of negativity towards PE, perpetuated by teachers with poor memories of PE and a lack of clarity on what to focus on, must now be disrupted. An obvious way forward would be to continue to invest in high quality CPD for our teachers, to upskill them so that they are in a position to provide enjoyable and engaging PE experiences for all children. The devastating economic impact of Covid 19 sadly casts doubt on the availability of future funding in this area. It therefore behoves primary schools to take matters into their own hands and to find ways to support their staff in-house. A pragmatic first step would be to design CPD opportunities to explore ways that established pedagogical approaches deployed in other curricular subjects can successfully be transferred to the context of PE. This focus would provide a realistic vision for teachers to work towards. Two foci are suggested for future research. Firstly, given the paucity of longitudinal studies that track the long-term health value of quality PE a study that examines the impact of AfL strategies in primary PE on adult lifestyles would be of value. A second research focus would be to explore the contribution that the science of learning can play in supporting teachers to engage children in PE.

Appendix 1

Table 1. Characteristics of the schools

School	Type of School	Number of Pupils on roll (National average is 282)	Number of FTE Teachers	Pupil: Staff ratio	Questionnaires returned
A	Primary 3-11	344	13	1:26	7
B	Primary 3-11	619	24	1:26	17

C	Private 3-11	270	20	1:14	17
D	Infant (4-7)	180	7	1:26	9
E	Primary 3-11	592	23	1:26	20
F	Primary 3-11	316	13	1:24	8
G	Junior (7-11	276	14	1:20	13
H	Primary 4-11	131	7	1:19	7
I	Primary 4-11	463	18	1:26	4
J	Primary 2-11	450	20	1:23	15
K	Primary 4-11	102	5	1:20	2
L	Primary 4-11	366	19	1:19	10
M	Primary 4-11	404	13	1:31	8
N	Primary 3-11	138	6	1:23	5
O	Primary 3-11	384	17	1:23	11
P	Primary 3-11	619	18	1:34	6
Q	Primary 4-11	305	12	1:25	9
R	Primary 2-11	343	15	1:23	12

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