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Exploring Australian teachers' perceptions of physical literacy: a mixed-methods study

Inimfon A. Essiet ^{a,b}, Elyse Warner ^a, Natalie J. Lander ^c, Jo Salmon ^c, Michael J. Duncan ^b, Emma L. J. Eyre ^b and Lisa M. Barnett ^d

^aSchool of Health and Social Development, Deakin University, Geelong, Victoria, Australia; ^bCentre for Sport, Exercise and Life Sciences, Coventry University, Coventry, UK; ^cInstitute for Physical Activity and Nutrition, School of Exercise and Nutrition Science, Deakin University, Geelong, Victoria, Australia; ^dInstitute for Physical Activity and Nutrition, School of Health and Social Development, Deakin University, Geelong, Victoria, Australia

ABSTRACT

Background: Physical literacy (PL) has generated substantial international interest across sport, health and education sectors. Teachers play a crucial role in supporting children's PL growth. Despite PL featuring in several physical education curricular texts, research into teacher understanding and perception of the concept is scarce. This study aimed to explore the understanding and perception of PL among Australian teachers of health and physical education (including generalists and specialists).

Methods: Utilizing an explanatory sequential mixed-methods study design, the first phase involved an online survey of 174 Australian teachers. The survey, developed from relevant literature, aimed to elicit an understanding of teachers' awareness, understanding, and perceptions of PL, and comprised a combination of open-ended, yes/no, Likert, and multiple-choice response options. The second phase involved semi-structured telephone interviews with nine survey participants, to build on survey responses. Interviews lasting on average 37 (range 28–58) minutes were digitally recorded and transcribed verbatim. For quantitative data, bivariate comparisons were made using chi-square tests to examine the relationships between teacher training (generalist versus specialist), age group, years of teaching experience, and teacher PL understanding. Interview data were analyzed using an inductive thematic approach to identify emergent theme clusters.

Results: Respondents ($n = 122$, male 48.4%) were mostly specialist trained teachers, with 10–14 years of teaching experience. Quantitative findings revealed that while most teachers were aware of PL, many only partially understood the concept, often interpreting it as an understanding of bodily movements and/or the benefits of physical activity participation. There were no differences in PL understanding by teacher training, age group, or years of teaching experience. Two main themes, identified from qualitative interviews, which provided further explanation of teachers' understanding and perception of PL were: (a) 'physical literacy has been a bit of a buzzword': perceptions of the PL concept and (b) 'It's a concept that needs to be ingrained': implementing PL in schools. Teachers acknowledged the potential importance and applicability of PL, however, expressed scepticism (e.g. buzzword) about the concept. Narrow understanding of the concept persisted during interviews. In

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terms of its implementation within schools, teachers highlighted the need for curriculum alignment, provision of resources and professional development opportunities, and policy changes. In recognizing these implementation strategies, teachers further noted potential barriers that could hinder PL implementation including time constraints, workload and busyness, and the lack of prioritization of physical education (PE) within schools.

Conclusion: Study findings revealed the urgent need to clarify the concept of PL for teachers given their critical role in ensuring effective and successful translation of research into educational practice. Resources, professional dialogue, and continuing professional development opportunities can support teachers' overall understanding and implementation of PL. This is important for potentially maximizing children's PL development across the lifespan.

Introduction

The concept of physical literacy (PL) has gathered prominence within the last two decades (Young, O'Connor, and Alfrey 2020), and transcends multiple sectors including sport, health, and education (Giblin, Collins, and Button 2014). From an education perspective, the United Nations Educational, Scientific and Cultural Organization's policy document contends that quality physical education programmes should target PL attainment (UNESCO 2015).

There are challenges, however, with the PL concept being plagued with a myriad of definitions, conceptualizations, and operationalizations (Shearer et al. 2018; Edwards et al. 2017). Acknowledging the contextual sensitivity of the concept and paucity of a globally embraced definition, Sport Australia (an Australian Federal Government body responsible for promoting sport) in 2019 supported the development of a PL definition and framework to clarify and promote coherency in PL development within the Australian context (Keegan et al. 2019). A modified Delphi approach resulted in the development of the Australian Physical Literacy Framework (APLF) which identified four intertwined domains (physical, psychological, social, and cognitive), comprising 30 elements as necessary for PL development. The APLF was created for use by multiple stakeholders including coaches, parents, and teachers in key settings, such as sport and schools (Scott et al. 2020).

Within the school setting, Physical Education (PE) presents an opportune and formalized setting for supporting children's PL growth (Stoddart and Humbert 2017), with teachers suggested as critical in ensuring each child's progress (Whitehead 2010). Teachers may also assist in creating awareness of PL to others within the school community (e.g. administration, parents) (Stoddart and Humbert 2017). Though PL is suggested to be relevant for all ages (Whitehead 2010), childhood has been identified as a critical phase for the development of attributes that contribute to lifelong physical activity practice (Belanger et al. 2018; Hulteen et al. 2020). Indeed, research suggests that physically active habits developed during childhood tracks into adulthood (Telama et al. 2005). Consequently, teachers within primary school settings are better situated as primary social agents in intervening and shaping aspects of children's PL towards sustained engagement in physical activity. However, teachers have a better chance of maximizing children's PL potential if they have a clear and thorough understanding of what the concept entails.

Yet, teacher PL understandings have been underrepresented in research (Robinson, Randall, and Barrett 2018; Stoddart and Humbert 2017). The few available studies, conducted predominantly in Canada and the United States, have noted teachers' confusion, incomplete, and misconstrued understanding of the concept (Robinson, Randall, and Barrett 2018; Harvey and Pill 2018; Stoddart and Humbert 2017; Lynch and Soukup 2016; Stanec and Murray-Orr 2011; Stoddart and Humbert 2021). For instance, Robinson, Randall, and Barrett (2018) reported that teachers equated PE and fundamental movement skills as PL. Teachers have also interpreted PL in light of their traditional

understandings of numeracy and literacy (Stoddart and Humbert 2017). Teacher characteristics (e.g. teacher training [PE specialist versus generalist], age group, or years of teaching experience) may influence teachers' understanding of PL. For example, Stoddart and Humbert (2017) reported that teachers with fewer years of teaching experience had a greater understanding of PL compared to longer-serving teachers.

Complicating matters further, while some countries explicitly feature PL in their PE curricula and standards documents, the term is lacking in others. In the United States, SHAPE America in 2014 replaced the term 'physically educated' with 'physically literate' in the National Standards and Grade Level Outcomes for K-12 Physical Education (Society of Health and Physical Educators (SHAPE) America 2014). This move was criticized as it occurred without widespread consultation with stakeholders in the PE profession (Lounsbery and McKenzie 2015). In Australia, PL is not explicitly referenced within the national PE curriculum (Australian Curriculum for Health and Physical Education) or those belonging to individual States and Territories (Macdonald and Enright 2013; Scott et al. 2020).

Ultimately, teachers are tasked with teaching/assessing/reporting against their national/state curriculum and ensuring that children attain achievement standards (Brown and Whittle 2021). If these standards (i.e. PL) are not explicitly specified in the pertinent curriculum documents (Macdonald and Enright 2013; Scott et al. 2020), it is unclear how and why teachers would teach/assess/report against them. As such, while the introduction of a PL framework in Australia is important, empirical evidence is lacking in relation to teachers' views on the concept. Given recent calls to introduce PL as a proposition which informs curriculum content (Brown and Whittle 2021), it would certainly be desirable that teachers as curriculum enactors share a common view/understanding of the concept. Broadly speaking, exploring teachers' views and perceptions are a necessary first step towards ensuring that PL is received, interpreted, and appropriately operationalized from research into educational practice. Hence, the current research aimed to explore Australian teachers' perspectives around PL awareness (Are teachers aware of PL? Are teachers aware of the APLF?); understanding (What do teachers understand as PL?); and perception (What are teachers' perceptions of the PL concept including its role within schools, implementation, and who should be responsible for supporting its development in children?).

Methods

Mixed-methods inquiry

The epistemological position underpinning this research is that of pragmatism (Creswell and Creswell 2017; Biesta 2010). In line with pragmatist views, objective and subjective viewpoints were considered, and qualitative and quantitative methods utilized. Specifically, an explanatory sequential mixed-methods research design was used in order to obtain a thorough understanding of the complex phenomena under investigation. This integrated, two-phase approach entailed first obtaining quantitative survey data on teachers' PL understanding and perception and explaining/building on the results using qualitative in-depth telephone interviews (Creswell and Creswell 2017).

Participant recruitment

Ethics permissions were granted by affiliated institutes' Ethics Committees (Deakin and Coventry University) prior to any data collection. Between October 2019 and February 2020, two of Australia's largest umbrella organizations for health and physical education (HPE) teachers – Australian Council of Health Physical Education and Recreation (ACHPER) and PEAK Phys Ed – were contacted via email for their support with study advertising. Other recruitment strategies utilized were promotion on Twitter, and at a state (Victoria) organized ACHPER conference by the research team. Teachers of children aged 5–12 years were invited to complete an anonymous online survey

by clicking a link provided on the advertisement. A total of 174 teachers clicked on the survey link and began filling in the survey. Of these, 103 responses were 100% complete. All teachers ($n = 30$) who indicated interest in having further involvement with the study were contacted for telephone interviews. Study recruitment took place from October 2019 to May 2020.

Data collection

Quantitative strand: survey design and validation

In the absence of a standardized and validated questionnaire, following an exploration of relevant literature in the PL sphere (Stoddart and Humbert 2017; Whitehead 2010; Tristani 2014; Stanec and Murray-Orr 2011; Vašíčková and Hříbňák 2013), a survey was designed by authors, with combined expertise in PL, PE, and physical activity. In devising the survey items, the first author engaged in a thorough review of the aforementioned literature to identify commonly occurring themes. These were then mapped on to the areas of PL understanding, perception, and assessment. The dominant themes informed item construction. Specifically, for teachers' PL understanding and perception (see Tables 2 and 3 containing 20 items in total), items covered the following aspects: definition/concept of PL (25% of total items); implementation of PL (20% of total items); attributes of a physically literate individual (15% of total items); impact of PL (15% of total items); components/constituents of PL (10% of total items); environments/contexts for PL development (10% of total items); and purpose of PL (5% of total items). The study team then engaged in repeated rounds of review and revision to enhance the survey content, including its comprehensibility. For face validity verification, the survey was piloted in October 2019 with three experienced physical educators. Suggested additions/modifications were made to enhance content clarity, relevance, structure and readability. Following the review, the survey was administered to teachers via Qualtrics – a secure online survey management platform. The survey took participants approximately 30 min to complete. No incentives were provided for study participation.

The survey was designed to elicit descriptive responses for a series of stand-alone items. Survey questions were grouped into three sections that addressed topics pertinent to participants' demographic characteristics, awareness of the PL concept and the APLF (Section 1); PL understanding (Section 2); perception of the role of PL in schools and responsibility for PL teaching in schools (Section 3). These sections comprised open-ended, yes/no, Likert, and multiple-choice response options. Two approaches were utilized to capture data on teacher understanding of PL (Section 2). First, an open-ended question inquired *What comes to mind when you hear the term physical literacy?*. Using the APLF (Sport Australia 2020a) as a guiding document, a process of quantifying all responses to this question was undertaken by the lead author. Consequently, teachers' responses were grouped into one of three major categories: *no understanding* (e.g. responses in relation to the traditional understanding of literacy), *partial understanding* (e.g. responses describing PL solely in relation to the physical domain), *full understanding* (e.g. responses recognizing the holistic nature of the concept and its constituent domains/elements) (see Appendix A). PL understanding was further explored through a series of close-ended statements aligned with contemporary views of the PL concept (Table 2).

Qualitative strand: interview guide

Of the 30 teachers who indicated interest in participating in an interview, nine could be contacted after several reminders. Semi-structured telephone interviews were conducted by the lead author who has a background in Public Health with a research focus on PL. Their view of the current global burden of physical inactivity aligns with the socio-ecological perspective of health and recognizes the potential PL presents in addressing those individual level factors. The lead author identified their background at the commencement of each interview and clearly specified to teachers that all perspectives on PL were welcome to discuss during the interviews. An interview discussion guide, designed based on a review of past literature (Stoddart and Humbert 2017; Whitehead

2010; Tristani 2014; Stanec and Murray-Orr 2011; Vašíčková and Hříbňák 2013) (Appendix B), was used to enable a more detailed explanation of the quantitative findings. Prior to each interview, each participants' survey responses were studied by the lead author and polarizing views were specifically highlighted to be further discussed during interviews. In line with the survey, open-ended questions on the interview guide focused on topics such as: awareness of the consensus definition and APLF (*How did you become aware of the APLF?*); PL understanding (*Is PE any different from PL? Explain how PL is/is not different to PE*); and perception of the PL concept and its role in schools (*What is your perception of the PL concept?*). To ensure relevance of questions contained within the interview guide, two pilot interviews were conducted with two university lecturers with a background in PE pedagogy. All interviews were digitally recorded using a handheld Olympus (Model WS-853) digital voice recorder, and transcribed verbatim by the lead author. Anonymity was ensured during the transcription process by assigning pseudonyms (e.g. Participant 1, see Table 4) to participants. To establish credibility, each participant was emailed the de-identified interview transcript and invited to comment on its interpretative accuracy (Smith and McGannon 2018; Shenton 2004). One participant returned their transcript with minor comments/corrections. The interviews lasted between 28 and 58 min (mean: 37 min).

Analytic strategy

Quantitative survey data were exported from Qualtrics to SPSS (version 26) for analysis. Descriptive statistics were used to report on demographic data and analyze teacher awareness of PL and its Australian definition and framework; understanding of PL; and perception of the role of PL in schools. Bivariate comparisons were made using chi-square tests of independence to explore relationships between teacher training (specialist versus non-specialist), age group (younger – 18–34 years ($n = 53$) versus older – 35+ years ($n = 69$)), years of teaching experience (less experienced – less than 10 years ($n = 55$) versus more experienced – 10+ years ($n = 67$)), and teacher PL understanding (full/partial understanding versus no understanding) as the outcome variable. Cut-off points for age group were based on the median split. Statistical significance level was set at $p < 0.05$.

For qualitative data, an inductive thematic analytical approach, as outlined by Braun and Clarke (2006) was used to enhance trustworthiness in this study (see Nowell et al. 2017). All interview transcripts were imported into NVivo 12 software, which facilitated the efficient management of large textual data in a systematic, traceable, and verifiable manner (Nowell et al. 2017). Key themes were established through a step-by-step analytical process involving data familiarization (transcribing, reading, and rereading data); code generation (assigning short descriptive labels to the entire data set); categorization (collating similar descriptive labels into categories); searching for and reviewing themes; and defining and naming themes. In the first instance, the lead author assigned initial codes to two transcripts. To ensure confirmability and coding reliability, the same transcripts were coded by two other authors independently (EW and NL). A high degree of agreement was found among the three researchers. Any discrepancies were resolved via a review and discussion. The lead author completed coding for the remaining transcripts, identifying a final list of codes representative of key concepts (e.g. important and valuable; buzzword). Similar codes were grouped together to arrive at a series of categories (e.g. important and valuable; scepticisms). Similar categories were further grouped to create subthemes (e.g. importance of the PL concept), with related subthemes grouped to form the final overarching themes (see Table 5). Authors IE and EW then engaged in continued review and refinement of the coded data (i.e. tabulated themes, subthemes, and associated quotes), to ensure its consistency and accuracy (Braun and Clarke 2006; Nowell et al. 2017). Following this analytical data refinement process, three overarching themes emerged from the data. This paper focuses only on themes related to participants' perception and implementation of PL. In the authors' view, these themes provide further clarifications/explanations to the quantitative results and were considered the most relevant given the research objectives (Braun and Clarke 2006). Table 5 displays the assignment of themes, subthemes, and codes to the data.

Results

Quantitative strand: teacher survey results

Due to early drop-out (e.g. providing only consent, or consent and demographic data), of the 174 teachers who started the survey, a total of 122 responses were analyzable (70% response rate). Of these 122 responses, 103 were 100% completed. [Table 1](#) provides details on the demographics of survey participants. Almost even numbers of participants identified as female and male, just over a third belonged to the age bracket 25–34 years, and a quarter had between 10 and 14 years of teaching experience. Participants predominantly taught in Victorian schools and were specialist trained HPE teachers. Most participants had a Bachelor's degree (particularly in PE).

Teachers' awareness of PL

The majority of participants in this study were aware of PL (85.2%, $n = 104/122$). However, less than half were aware of the APLF (47.9%, $n = 58/121$).

Teachers' understanding of PL

Close-ended responses

Responses to close-ended questions aimed at exploring teachers' PL understanding are provided in [Table 2](#). Almost a third (31.6%) of participants agreed that being physically literate and physically educated meant the same thing, with around half disagreeing (49.7%), and a fifth unsure (19.7%). Just over half of teachers considered PL to be primarily about developing fundamental movement

Table 1. Demographic characteristics of survey participants.

Demographic		N	%
Gender ($n = 122$)	Male	59	48.4
	Female	61	50.0
	Prefer not to specify	2	1.6
Age group ($n = 122$)	18–24 years	9	7.4
	25–34 years	44	36.1
	35–44 years	33	27.0
	45–54 years	25	20.5
	55 years and above	11	9.0
Australian State or Territory ($n = 122$)	Victoria	104	85.2
	Western Australia	5	4.1
	New South Wales	5	4.1
	Australian Capital Territory	2	1.6
	Queensland	2	1.6
	South Australia	2	1.6
	Northern Territory	1	0.8
	Tasmania	1	0.8
Educational background ($n = 114$)	Bachelor's degree (e.g. Physical Education, Primary, Education, Exercise Science, Applied Science in Physical Education)	72	63.1
	Multiple degrees (e.g. multiple bachelor's degree, Bachelors + Honours, Bachelor's + Graduate Diploma, Bachelor's + Masters)	39	34.2
	Doctorate degree	3	2.6
Physical Education specialist ($n = 122$)	Yes	98	80.3
	No	24	19.7
Years of teaching experience ($n = 122$)	Less than one year	6	4.9
	1–4 years	22	18.0
	5–9 years	27	22.1
	10–14 years	30	24.6
	15–19 years	11	9.0
	20–24 years	10	8.2
	25+ years	16	13.1

Table 2. Responses to statements close-ended statements aimed to elicit teachers' understanding of PL.

Statement	Strongly Disagree N (%)	Disagree N (%)	Unsure N (%)	Agree N (%)	Strongly Agree N (%)
Physical literacy is primarily about developing fundamental movement skills (e.g. catching, throwing, running, kicking, jumping etc.) (<i>n</i> = 117)	11 (9.4)	29 (24.8)	14 (12.0)	44 (37.6)	19 (16.2)
Physical literacy is essential for helping us lead healthy and fulfilling lives through physical activity (<i>n</i> = 117)	7 (6.0)	9 (7.7)	6 (5.1)	36 (30.8)	59 (50.4)
Being physical literate and physically educated mean the same thing (<i>n</i> = 117)	6 (5.1)	51 (43.6)	23 (19.7)	29 (24.8)	8 (6.8)
Physical literacy can be developed in a variety of environments including land, water, air and snow (<i>n</i> = 117)	2 (1.7)	6 (5.1)	5 (4.3)	53 (45.3)	51 (43.6)
Not every individual can develop physical literacy (<i>n</i> = 117)	52 (44.4)	43 (36.8)	10 (8.5)	7 (6.0)	5 (4.3)
Physical literacy can be developed through school physical education classes, sport, recreation, physical activity and NOT through incidental activities (e.g. using the stairs rather than lifts, standing desks etc.) (<i>n</i> = 117)	17 (14.5)	53 (45.3)	15 (12.8)	23 (19.7)	9 (7.7)
Physical literacy means being able to read and write while moving the body (such as balancing, walking on a beam etc.) (<i>n</i> = 117)	62 (53.0)	30 (25.6)	13 (11.1)	10 (8.5)	2 (1.7)
Some children are more naturally physically literate than others (<i>n</i> = 114)	5 (4.4)	17 (14.9)	11 (9.6)	63 (55.3)	18 (15.8)
Physical literacy is building skills, knowledge, and behaviours needed for lifelong movement and physical activity practice (<i>n</i> = 114)	3 (2.6)	8 (7.0)	4 (3.5)	34 (29.8)	65 (57.0)
Physical literacy is inclusive of some forms of numeracy (<i>n</i> = 114)	8 (7.0)	21 (18.4)	38 (33.3)	37 (32.5)	10 (8.8)
Children who are physically competent are also physically literate (<i>n</i> = 114)	8 (7.0)	51 (44.7)	28 (24.6)	24 (21.1)	3 (2.6)
A physically literate person has the ability to draw on their physical, psychological, cognitive and social capacities to support lifelong physical activity practice. (<i>n</i> = 114)	1 (0.9)	5 (4.4)	7 (6.1)	46 (40.4)	55 (48.2)
The Australian Physical Literacy Framework recognizes 30 elements as foundational to physical literacy development in individuals (<i>n</i> = 114)	1 (0.9)	7 (6.1)	53 (46.5)	33 (28.9)	20 (17.5)

skills (53.8%), and almost half were unsure or believed that children who are physically competent are also physically literate (48.3%).

Open-ended responses

After quantifying responses to the open-ended question aimed to elicit teachers' PL understanding, 20.5% (*n* = 25/122) of teachers were categorized as having *no understanding*, 60.7% (*n* = 74/122) as having *partial understanding*, and 18.9% (*n* = 23/122) as having *full understanding* of PL (see Appendix A for categories of responses to the open-ended question). Leaving aside participants who categorically reported that they had no understanding of PL, some quotes derived from teachers assigned to the *no understanding* category were PL is: 'physical activity improving literacy outcomes', 'using physical education to improve literacy', and 'multi literacy theory which was in vogue late 90s'.

Most participants assigned to the *partial understanding* category tilted towards describing PL as an understanding of bodily movements, the benefits of physical activity, or the language of health. For example, some participants described PL as 'The ability of students to understand their body and how to move in various physical activity situations', 'understanding PE terms and movement', 'understanding messages around physical activity and health', 'understanding movement or sporting terms', 'children understanding how to control and move their body'. Also assigned to this category were teachers who described PL solely in terms of physical

proficiency or fundamental movement skills. For example, PL is ‘developing fundamental skills that allow you to participate in physical activity’, ‘physically proficient in a range of environment which will promote participation in physical activity throughout life’, and ‘gradual improvement of physical skills’.

Lastly, the few participants classified as having *full understanding* of PL recognized the attributes of PL including its lifelong holistic nature and constituting domain/elements. Example quotes included ‘skills, knowledge, attributes, competence, confidence, motivation to engage in life long physical activity’, and ‘the ability for people to use fundamental movement, psychological, social and cognitive skills in a motivated and confident capacity to enjoy everyday lifestyle and sports related activities’.

Association between teacher characteristics and PL understanding

Three chi-square tests of independence showed that teacher training (specialist versus non-specialist; $p = 0.264$, Fisher’s exact test), age group (18–34 years versus 35 + years; $\chi^2 [1, N = 122] = 0.004$, $p = 0.950$), and years of teaching experience (less than 10 years versus 10 + years; $\chi^2 [1, N = 122] = 0.328$, $p = 0.567$) were not associated with PL understanding (full/partial understanding versus no understanding).

Teachers’ perception of the role of PL in schools

Table 3 provides responses to close-ended questions aimed at exploring teacher’s perception of the role of PL in schools. The vast majority of teachers believed that PL is an important and valuable concept (92.1%) and, if provided with adequate knowledge regarding the concept, they were willing to implement its concepts in their classroom (83.8%). When asked about who should be responsible for supporting children’s PL teaching within schools, most teachers ($n = 85/110$) selected ‘All of the above’ which was indicative of HPE teachers, classroom teachers, wellness/wellbeing coordinator/s, and principals.

Qualitative strand: results from teacher interviews

Interview participants were mostly female, aged between 35 and 44 years. Six teachers were specialist HPE teachers and two were non-specialist teachers teaching PE (one participant did not provide demographic data). Teacher experience ranged from one to over 25 years, with teachers from

Table 3. Teacher perception of the role of PL in schools ($n = 111$).

Statement	Strongly disagree <i>N</i> (%)	Disagree <i>N</i> (%)	Neither <i>N</i> (%)	Agree <i>N</i> (%)	Strongly agree <i>N</i> (%)
Physical literacy is NOT an important and/or valuable concept ($n = 114$)	68 (59.6)	37 (32.5)	1 (0.9)	5 (4.4)	3 (2.6)
Physical literacy should NOT be ranked as highly as numeracy and literacy in the school education curriculum ($n = 111$)	35 (31.5)	42 (37.8)	13 (11.7)	13 (11.7)	8 (7.2)
Physical education and sport in schools should foster physical literacy in every school-aged child ($n = 111$)	4 (3.6)	4 (3.6)	10 (9.0)	41 (36.9)	52 (46.8)
Teachers play a pivotal role in developing children’s physical literacy ($n = 111$)	3 (2.7)	4 (3.6)	9 (8.1)	43 (38.7)	52 (46.8)
Quality health and physical education (HPE) curriculum should address the physical literacy concepts ($n = 111$)	2 (1.8)	5 (4.5)	9 (8.1)	36 (32.4)	59 (53.2)
If provided with adequate knowledge, I would be willing to implement the physical literacy concept in my classroom ($n = 111$)	2 (1.8)	5 (4.5)	11 (9.9)	30 (27.0)	63 (56.8)
Our school’s policies and/or practices contribute to physical literacy opportunities for students ($n = 111$)	4 (3.6)	11 (9.9)	29 (26.1)	45 (40.5)	22 (19.8)

Table 4. Interview participants' demographics ($n = 9$).

Participant no	Gender	Age group	Australian State or Territory	Educational background	Physical Education specialist	Years of teaching experience
Participant 1	Male	25–34 years	Victoria	Bachelor of Applied Science (Physical Education)	Yes	5–9 years
Participant 2	Female	45–54 years	Victoria	Bachelor of Education (Secondary), Bachelor of Applied Science (Human Movement) Honours, PhD	Yes	20–24 years
Participant 3	Female	55 + years	Victoria	Bachelor of Teaching	No	25 + years
Participant 4	Female	55 + years	Victoria	Diploma Teaching, Graduate Diploma (Special Education)	No	25 + years
Participant 5	Female	35–44 years	Victoria	Bachelor of Applied Science (Physical Education)	Yes	15–19 years
Participant 6	Male	35–44 years	Victoria	Bachelor of Education (Physical Education), Masters Preliminary (Applied Science Human Movement)	Yes	20–24 years
Participant 7	Female	–	–	–	–	–
Participant 8	Male	18–24 years	Western Australia	Bachelor of Science (Sport Science and Exercise and Health), Graduate Diploma of Education (Physical Education)	Yes	1–4 years
Participant 9	Female	35–44 years	New South Wales	Bachelor of Teaching, Bachelor of HPE (Hons.)	Yes	15–19 years

Victoria, New South Wales, and Western Australia represented (Table 4). Based on their survey responses, six of these teachers were categorized as having full understanding, two as partial understanding and one as having no understanding of PL. Two themes that best describe Australian teachers' understanding and perceptions of PL derived from inductive thematic analysis were: (i) 'Physical literacy has been a bit of a buzzword': Perceptions of the PL concept; and (ii) 'It's a concept that needs to be ingrained': Implementing PL in schools (Table 5). The emergent themes, including supporting excerpts derived from teacher interviews, are presented below.

Theme 1: 'Physical literacy has been a bit of a buzzword': Perceptions of the PL concept

Teachers spoke extensively about their perceptions of the PL concept and two subthemes were derived including: (i) importance of PL as a concept, and (ii) understanding of PL.

Subtheme 1: Importance of PL as a concept

Teachers referred positively to PL, in terms of its perceived importance and applicability within schools. Its benefits were suggested to be broad in nature:

If they're [children] engaged with physical literacy continuum and engaging in movement in a bigger, broader context than just being good at sports, I think we'll end up with more confident and more competent learners that have more transferable skills across a range of contexts. It will become about the joy of movement. [Participant 9]

Teachers further described PL as extremely beneficial given the current technology inclined climate/society and its attendant sedentariness. According to teachers, skills and dispositions acquired through PL in the early years could be progressed in later years of life. Closely tied to this appreciation, the presence of an agreed upon definition and framework for PL, as provided by Sport Australia, was considered particularly useful by teachers.

I think that's good that you've got like consensus about a definition of physical literacy so that the teachers in Australia can all understand the same definition. [Participant 8]

Table 5. List of subthemes and codes nested under each main theme regarding teachers' understanding and perception of physical literacy.

Theme	Subtheme	Codes (<i>n</i> Teacher, <i>n</i> references)	Collapsed to (<i>n</i> Teacher, <i>n</i> references)
'Physical literacy has been a bit of a buzzword': Perceptions of the physical literacy concept	Importance of the PL concept	Important and valuable (5, 10) a Technological impact (4, 4) a Support of the framework (5, 9) a Explicit reference in the curriculum (5, 9) a Buzzword (4, 10) b Scepticism around PL push – confusing, added layer, increases the status of PE (4, 23) b Inconsistent definition and evolving conceptualization (3, 5) b	(a) Important and valuable (8, 32) (b) Scepticisms (7, 32)
	Understanding of PL	PL is PA engagement, PA knowledge, and FMS (3, 6) a PL is PE and play based learning (1, 4) a Quality HPE curricular outcome (6, 16) b Aligned with the HPE curriculum (7, 19) b PL is holistic (8, 23) c PL is lifelong movement (4, 5) c PL operates on a continuum (1, 1) c PL extends beyond the context of physical education (3, 5) d PL is linked with peer coaching (1, 1) d	(a) Misconceptions and/or incomplete conceptualization (5, 11) (b) Curriculum aligned/outcome (8, 35) (c) PL attributes (8, 29) (d) Context (4, 6)
'It's a concept that needs to be ingrained': Implementing physical literacy in schools	PL implementation – strategies and barriers	<i>Strategies</i> Ingrained in curriculum (1, 1) a Explicit reference and alignment with the curriculum (4, 5) a Provision of resources and exposure to continuing professional development opportunities (6, 14) b Training and guidance on PL application (4, 12) b Explaining the 'why' (1, 1) b Focus on preservice teachers (2, 3) b Availability of funding opportunities (1, 3) b Top-level push (4, 7) c Organizational support (3, 3) c	(a) Curriculum alignment (4, 6) (b) Provision of resources (including funding), training, and professional development opportunities (6, 33) (c) Policy changes (6, 10)
		<i>Barriers</i> Time constraints (5, 8) a Teacher workload and busyness (3, 6) b Teacher willingness (3, 4) c Teacher's own PL, knowledge and training (7, 13) c Lack of funding (1, 1) d Teacher current practices not linked to the curriculum (2, 2) e FMS focused teaching and assessment (4, 6) e Lack of accountability (1, 3) f Lack of prioritization of PE in schools (4, 12) g	(a) Time constraints (5, 8) (b) Teacher workload and busyness (3, 7) (c) Personal factors (7, 17) (d) Lack of funding (1, 1) (e) FMS focused teaching and assessment (5, 8) (f) Lack of accountability (1, 3) (g) Lack of prioritization of PE in schools (4, 12)

(Continued)

Table 5. Continued.

Theme	Subtheme	Codes (<i>n</i> Teacher, <i>n</i> references)	Collapsed to (<i>n</i> Teacher, <i>n</i> references)
	Supporting children's PL development – the 'who' and the 'how'	<i>The 'who'</i> (8, 26) Whole school approach (3, 6) a Teachers, coaches, and sporting organizations (3, 4) a School (4, 6) a Family (4, 7) b Community (2, 3) c <i>The 'how'</i> Whole-child development (4, 4) a Wellbeing focused (1, 1) b MVPA, FMS and movement vocabulary focused (3, 4) c Building psychological elements (5, 7) d	(a) Whole school (8, 26) (b) Family (4, 7) (c) Community (2, 3) (a) Whole-child development focused (4, 4) (b) Wellbeing focused (1, 1) (c) Movement and FMS focused (3, 4) (d) Psychological domain focused (5, 7)

Note: a Reported codes are the conceptual labels applied to the transcribed data. The numbers reported in parenthesis represent the number of interviewees and the number references associated with each code, respectively. The letter following the parenthesis, correspond to the collapsed categories in the right-hand column.

There were, however, observations that PL lacked explicit recognition within the Australian HPE curriculum:

I read that syllabus [Australian HPE curriculum] quite a few times and I don't actually think it's [physical literacy] in there, which is worrisome. I think it's implied, but it's not explicitly stated in there. [Participant 9]

Participant 2 further highlighted that '... New South Wales have embraced the idea of physical literacy, but it sits outside their curriculum'. Many teachers suggested that an explicit reference of PL within the Australian HPE curriculum could potentially increase PL's value, importance, as well as understanding of the concept.

Physical literacy needs to be a stronger component and I don't think, the Victorian Curriculum, in its current form doesn't pay homage to physical literacy. Just touches on elements of it but needs to be more explicit for teachers interact with that as an idea. [Participant 1]

Despite acknowledging PL's importance, several teachers remained sceptical about the concept. According to teachers, within educational circles, there exists many literacy-related 'buzzwords' which often emerge and later become extinct. PL was regarded as one such 'buzzword' (Participant 7). Participant 8 emphasized 'I think they [literacy-related words], these words just come and go'. Teachers also commented that given the prioritization of literacy and numeracy, the term 'physical literacy' has been adopted in an attempt to give credence or 'increase the status' (Participant 6) of a known subject area (PE). There were suggestions that with the presence of numerous literacy and PE-related terms, as well as the inconsistency in PL's definition and conceptualization, introducing PL into the mix could potentially confuse teachers. Teachers may also view PL as an 'added layer' to their already heavy workload:

So, if we've also got to develop their health literacy and we've got to develop their physical literacy and we've got to develop their digital literacy and we've got to develop their music literacy. So, it's a term that has been added to so many things that I think teachers anecdotally, I don't have the evidence, teachers are just going 'it's another thing. What is this thing that I am being expected to do now?'. [Participant 2]

Some teachers expressed concerns that PL need not be 'another thing' which teachers/schools are asked to do. To teachers, their accountability was essentially towards adequate curriculum delivery and taking a different approach could potentially drive the focus away from this goal:

... I personally think it would get a bit confusing and you might have some people, because physical literacy is brand new, they take it on board and be doing that as opposed to what they should be doing with the curriculum. [Participant 7]

Subtheme 2: Understanding of PL

A few interview participants expressed misconceptions and/or partial understanding of PL. PL was narrowly interpreted as physical activity engagement and an understanding of the benefits of physical activity participation. Participant 7 reported, 'What I understand of it is, physical literacy is looking at, people understanding of the importance of being physically active throughout their life span'. Furthermore, the lines of demarcation between PL and physical competence were blurred for one participant (Participant 6), who when asked whether both concepts meant the same thing, responded in the affirmative, despite having prior reading around PL. Additionally, in light of their traditional understanding of the word 'literacy', some participants believed that PL had 'a sort of academic component to it' [Participant 4]. Echoing these perceptions, Participant 8 acknowledged the general lack of understanding of PL amongst colleagues:

I don't think to be honest many PE teachers understand it at all, and they probably just think it is the same as physical education. [Participant 8]

In contrast, a number of participants expressed a clear and comprehensive knowledge of PL and its broader attributes. For example, some teachers noted that PL development is lifelong, holistic, extended beyond proficiency in fundamental movement skills and could be applied in contexts outside of PE. Teachers also reported that the HPE curriculum in its current form was strongly aligned with the PL framework, 'They are all the things that I do but it's just put into different areas [of the curriculum]. You know, everything I do in PE' (Participant 3). Lastly, to the teachers' understanding, physically literate children were a product of adequately and effectively delivered quality HPE curriculum:

I think that if you are delivering a Quality Health and PE program and you are educating the child holistically, then ... students should have the knowledge, skills and understanding to make good choices regarding their lifelong involvement in physical activity. [Participant 2]

Theme 2: 'It's a concept that needs to be ingrained': Implementing physical literacy in schools

Linked to adequate curriculum delivery, teachers openly expressed their ideas around PL implementation in schools; highlighted barriers that could hinder PL implementation; and identified key players in supporting children's PL. This resulted in two subthemes including: (i) PL implementation – strategies and barriers, and (ii) Supporting children's PL development (the *who* and the *how*).

Subtheme 1: PL implementation – strategies and barriers

Teachers readily provided strategies and recommendations for successfully implementing PL within schools. These included curriculum alignments; provision of resources (including funding), training and professional development opportunities; and policy changes (e.g. top-level support). Regarding curriculum alignment, some teachers recommended that integrating PL in schools would warrant changes to the curriculum.

I think it's a concept that needs to be ingrained in like the HPE curriculum ... but explicitly stated, I think that'd be a good thing. Because then everyone, like every PE teacher will have to look at that sort of framework and then have to have an understanding of it. [Participant 8]

In this way, the links between the curriculum and the framework are explicit enough for teachers to understand and integrate in their teaching. Teachers also spoke extensively about the paucity of,

and therefore need for, resources (including funding), training and professional development opportunities to enhance teacher's knowledge and expertise of PL and its implementation. Participant 6 noted, 'We need to have sufficient material resources and learning for staff to be able to say, I am proficient in what physical literacy is, and then to actually be able to go forward and teach it'. Participant 9 expressed an immense desire to learn more about PL but suggested they would not 'even know who my expert in Australia would be'. It became evident that teacher understanding of PL was intertwined with its implementation within schools. In terms of what constituted effective learning on PL for teachers, Participant 9 further elaborated:

I think that having say a ... series of webinars, short, punchy, ... leading into and leading out of the lesson would be really effective. ... And really starting to look at what does best practice look like, because it's all good and well to ... have a course, but we need to see what schools are doing it really well. [Participant 9]

Additionally, though the provision of resources and training was considered an effective approach, many teachers suggested that for PL to truly gain its rooting within schools, a top-level push from educational bodies (e.g. the Department of Education) was crucial.

Yeah, so I think it's [physical literacy] important, but the challenge of course, getting footing or getting someone to actually listen and consider what's happening. So, having I guess government agency come in and say, 'right, this is what has to happen, you don't have a choice'. That becomes much more influential as far as developing some sort of policy within a school structure. [Participant 6]

Despite highlighting these strategies, teachers identified several barriers that may hinder implementation. Teachers emphasized that they were faced with a time crunch to deliver the curriculum as intended. Teachers also explained more specifically that it would be challenging to address PL in their teaching considering their workload and busyness. This was especially so for classroom teachers who are mandated to deliver other curriculum subjects alongside HPE.

I'm not sure, people are really busy ... I'm not sure how much of physical literacy framework would necessarily get picked up within the time frame that people have ... Classroom teachers probably wouldn't pick it up because they are just so busy. [Participant 7]

Teachers further disclosed that 'literacy and numeracy are such a huge push in the primary years' (Participant 2), and worried about the seemingly low prioritization of PE in schools which could have a trickle-down effect on PL's implementation. Parents were identified as playing a major role in this lack of prioritization.

... if I can make a really big point on that, parents, when they get their report, are more interested in their [child's] academics for three hours than they are in whether they can throw, catch, jump. They're not really interested in the PE report. [Participant 4]

This lack of prioritization of PE was, in turn, suggested to impact accountability placed on PE teachers. Teachers further reported that a barrier to implementing PL was that PE classes were geared mainly towards developing and assessing 'fundamental movement skills' (Participant 5). Other personal factors identified as barriers included teachers' own PL, along with their knowledge, training, and willingness to implement the concept. Finally, lack of funding was also suggested as a potential hindrance to PL implementation:

So, these elements that we want to teach our students. Some of the socio-ecological barriers like around like income and things like that have provided a barrier to teaching water skills regularly through the curriculum. [Participant 1]

Subtheme 2: Supporting children's PL development (the who and the how)

Generally, teachers suggested the need for a collaborative effort 'beyond Health and PE staff' (Participant 1) to fully support children's PL development. This approach entailed contributions from key players including schools, teachers, coaches, sporting organizations, family, and the

community. For instance, school support could be through the provision of equipment and resources, as well as ‘through clubs or different things’ (Participant 7). Outside of schools, teachers suggested that the community/council played a role, for instance, by ‘making sure they maintain bike paths and ... keep building playgrounds and an environment that provides kids with heaps of opportunities to play outside’ (Participant 8). For the parental role, one teacher noted:

I think parents play an incredible part in that, ... I actually think me as a parent, because if I’m modelling good behaviours and the importance of being physically active, then that’s what my child is going to observe and perceive as being important. [Participant 7]

Furthermore, despite not being explicitly featured within the Australian HPE curriculum, inductive analysis uncovered a range of ways participants were currently integrating components of PL in their teaching/classrooms. For example, teachers reported that their PE lessons were focused on developing the whole child, their wellbeing, or improving certain domains/components of PL (e.g. daily physical activity participation, fundamental movement skill, motivation for physical activity).

So, there’s no, physical literacy isn’t explicitly mentioned in there at all. But we try and have that, the concept of the psychological, social, physical all working together, emotional working together throughout the program. [Participant 5]

Teachers further indicated some teaching strategies they utilized in building individual elements of the APLF during PE. For instance, in building the element *relationship* (social domain of the APLF), Participant 5 reported creating a safe learning environment for children:

So, it’s just about everyone feeling emotionally safe. So, we use peaceful hands when we’re interacting with each other. We use kind words, smiles and we say positive language. No put downs but positive words. [Participant 5]

Discussion

This study is the first to present an in-depth analysis on teachers’ understanding and perception of PL, which extends our understanding of an area regarded by previous writers (Durden-Myers and Keegan 2019; Robinson, Randall, and Barrett 2018) as underresearched. These insights into teachers’ understanding and perception of PL are a necessary first step towards ensuring that PL is appropriately and adequately translated from theory into PE practice.

Awareness of PL

Brown and Whittle (2021, 3) recently argued that ‘the term “physical literacy” pervades the lexicon of HPE teachers’, albeit with varying uses, intents, and purposes. Their observations resonate with our principal finding that most Australian teachers are aware of the concept of PL. In contrast, another study reported that teachers working in early education settings in the United Kingdom were unaware/unfamiliar with the term PL (Foulkes et al. 2020). Within our sample, less than half of the teachers were aware of the APLF. Worth emphasizing is that data collection for this study commenced in the same month the APLF (final version) was published (Sport Australia 2020b). One may argue that the lack of awareness of the APLF may be due to the timing of data collection; although it is important to note that the draft version was publicly available two years prior. Another possible explanation is that within Australia, PL’s publicizing has mostly been championed by the national government funded sporting body, Sport Australia, rather than the education sector. Besides the APLF document, Sport Australia has released its own position statement on PL, coupled with resources for stakeholders (e.g. policy makers, parents and families, schools and educators) to follow for PL enactment (Brown and Whittle 2021). We speculate that teachers would be more conversant with the APLF had it been released and promoted by the

Department of Education or the Australian Curriculum, Assessment and Reporting Authority; the latter is responsible for Australia's curriculum enactment and reforms. These findings highlight the need for Australia's sporting and educational bodies to work collaboratively if the goal is for all teachers to be aware of PL.

Understanding of PL

Most teachers in their responses to the close-ended survey demonstrated a clear and concise understanding of PL. However, it was evident that some teachers perceived PL as the same as being physically educated or physically competent (Table 2). Whitehead (2010), in her seminal text, made an important distinction between these concepts – PE is a medium through which PL may be attained, whilst PL is the outcome of an adequately delivered PE programme. Fundamental movement skills on the other hand are basic building blocks for more complex movements (Clark and Metcalfe 2002), and form part of the physical component of PL (Whitehead 2010). An implication of such interpretations (i.e. PL equals physical competency) is that it indorses the 'body-as-machine' notion and as such, contradicts Whiteheadian views of the concept (Young, O'Connor, and Alfrey 2020).

However, on further exploration, many teachers were unable to provide a comprehensive account of PL. For instance, PL was narrowly interpreted as understanding of the benefits/actual engagement in physical activity or fundamental movement skills. Our findings reinforce results of data obtained from focus group discussions with PE teachers in four Canadian provinces (Robinson, Randall, and Barrett 2018), as well as preschool teachers in the United Kingdom (Foulkes et al. 2020). These findings are perhaps unsurprising and could be the unintended consequence of the multiple definitions of PL (Young, O'Connor, and Alfrey 2020). As Edwards et al. (2017) and Young, O'Connor, and Alfrey (2020) point out, some circulating definitions have digressed from Whitehead's vision of PL, and consequently, have focused primarily on fundamental movement skills or lifelong physical activity practice. For instance, Balyi and colleagues define PL solely in terms of proficiency in fundamental movement skills, foundational sport skills, and basic human movement (Balyi, Way, and Higgs 2013). The lack of a thorough understanding of PL by teachers could also be because the concept is communicated in a language not suitable for the audience being served. Indeed, Durden-Myers and Keegan (2019) have suggested that the philosophical underpinnings of the concept (i.e. monism, existentialism and phenomenology) may make PL particularly difficult for practicing teachers to assimilate. Young, O'Connor, and Alfrey (2020) in their recent analysis of the conceptual evolution of PL highlighted that PL definitions operating at high levels of abstraction have significantly deviated from Whitehead's (2001) conception of PL and as such, do not acknowledge PL's underpinning philosophies, defining attributes, or lifelong nature. The authors further note that an important feature of such definitions are their simplistic nature. It is perhaps the flavour of such simplicity that has resulted in the adoption and subsequent narrow interpretations of PL by teachers. In fact, reinforcing our speculations, Foulkes et al. (2020) in their recent qualitative study among preschool teachers in the United Kingdom reported that all teachers expressed concerns regarding the International Physical Literacy Association's definition of PL, suggesting it was 'wordy', 'long-winded', 'difficult to understand' and 'could be condensed' (12). If teachers are unable to distinguish between PL and its related nomenclatures (e.g. PE, fundamental movement skills, physical competence) or translate its philosophies into teaching practice, it may be challenging for them to support all facets of children's PL development.

Furthermore, specialist PE teachers likely possess more domain-specific experience and expertise in teaching PE, compared to non-specialists (McDonald, Kazemi, and Kavanagh 2013). Consequently, one could postulate that specialist PE teachers would have a better understanding of the PL concepts. However, similar to findings in a Canadian study (Stoddart and Humbert 2017), we noted that teacher training (specialist versus non-specialist) had no significant association with teachers' understanding of PL. This may reflect the lack of adequate training and education

around PL for Australian teachers, regardless of their specialization. A professional development programme (comprising a 3-month needs assessment phase, 1-hour workshop, and 6-month physical literacy intervention) has been shown to be effective in upskilling teachers (including specialist and non-specialist) knowledge of PL (Edwards et al. 2019). There is therefore an urgent need to better support and clarify the concept to all teachers, through initial and ongoing teacher education, in order to facilitate their efficacy in supporting children's PL development.

Perception of PL

Despite their mixed understanding of the concept, teachers generally acknowledged the value and importance of PL. Most survey participants recommended that PL be ranked as highly as numeracy and literacy and considered PE as appropriate contexts to foster children's PL development. Teachers also considered themselves as critical in ensuring children's PL development and were willing to address/implement its concepts in their daily practice. Despite these positive results, teachers expressed some scepticism and concerns about PL during in-depth interviews. Some teachers likened the PL term to a 'buzzword' adopted to give academic credence to PE. Somewhat aligned with our findings, Brown and Whittle (2021) have suggested that HPE teachers apply the term in an effort to remain contemporary in their daily curricular practice. Lounsbury and McKenzie (2015, 143) further suggested that 'its adoption [PL] has generally been substantiated on the basis that it will help to elevate the profession [physical education] by providing increased clarity and by coming into line with current general education trends'. Teachers' perceptions that PL may be a short-lived trend which is vulnerable to extinction may be responsible for the lack of understanding of the concept among teachers in the current study.

There is a lack of research exploring how teachers can introduce PL in their PE lessons (Durden-Myers and Keegan 2019). Stanec and Murray-Orr (2011) noted that, despite identifying as being somewhat physically literate, teachers struggled to implement PL concepts in classrooms. Although the APLF sought to provide clarifications on the concept of PL for Australian teachers, coaches, policymakers, children and researchers (Keegan et al. 2019), it does not provide clear guidance on how teachers may implement its components alongside their current curriculum (Scott et al. 2020). Scott et al. (2020) has suggested that appropriately integrating the PL framework into HPE programmes remains a challenge. In a previous study, Foulkes et al. (2020) reported that to support PL implementation within programmes, preschool teachers reported the need for high-quality training and practical ideas prior to sessions. A need for a broader training programmes centred not only on PL, but physical activity (and its importance) was further expressed. To effectively implement PL in schools, teachers in our study have suggested the need for curriculum alignment, provision of training, resources, and professional development opportunities, as well as policy changes. If the goal is to achieve a physically literate Australian population, Australia's education sector *may* consider a more direct approach through an explicit inclusion of the concept within the national HPE curriculum and/or those belonging to individual states and territories. Additionally, professionals in education and sporting sectors need to work more closely with teachers to provide them with information, resources, and continuing professional development opportunities to enhance their understanding of PL's implementation in teaching. Gleddie and Morgan (2021) have also recently published a comprehensive theoretical framework to assist educators with practical guidance on the implementation of PL's tenets in PE programmes to support student's PL growth. Lastly, although the potential hindrances to PL's implementation identified by teachers in this study were mainly institutional (i.e. outside teachers' control, e.g. lack of prioritization of PE, lack of funding) and as such, require considerable negotiation and strong leadership to manoeuvre (Jenkinson and Benson 2010); some of the other teacher-related barriers (e.g. personal factors including teachers' own knowledge) could be ameliorated by equipping teachers with proper knowledge on PL's implementation.

In interpreting the results of this study, we acknowledge its limitations, one being that though the survey was bespoke, quantitative data were descriptive in nature. Furthermore, although the survey was examined for face validity – a component of content validity (Terwee et al. 2018), other measurement properties (e.g. structural validity, reliability) were not evaluated. The Consensus-based Standards for the selection of health Measurement INstruments (COSMIN) recommends the exploration of content validity utilizing the targeted tool users and experts/professionals (Mokkink et al. 2019). For our study, content validity was only explored with the targeted tool users (i.e. teachers).

Regarding the qualitative aspect, Shenton (2004) highlights strategies necessary to establish trustworthiness of qualitative research, specifically in the areas of credibility, transferability, confirmability, and dependability. For this study, credibility was promoted via frequent debriefing sessions between the first author and the study team. Member checks involved emailing de-identified transcripts to all participants to confirm their accuracy. The authors however note that this research would have benefitted from a second dimension of member checking that involved participants' verification of the emergent themes and subthemes following their construction. Regarding transferability, the context of this research has been well described (for example, by providing the number of organizations participating in the study, time period of data collection, length of data collection sessions, and data collection methods [Shenton 2004]). However, since the majority of our interviewed teachers came from the state of Victoria, this may hinder the extent to which qualitative findings can be applied to teachers in other states/territories.

Nonetheless, this work lays a foundation that can be built upon by examining PL understanding and perception of teachers who work in different countries with different curricula. Lastly, we had a greater representation of teachers with PE backgrounds and those with some knowledge of PL, most especially during our interviews. As such, it is possible that the views presented in this study are representative of teachers with some interest in PL and/or those who hold strong views regarding the topic.

Conclusion

Teachers are fundamental players in ensuring that children develop skills and attributes that support PL and ensure sustained engagement in physical activity. This explanatory sequential mixed-methods study provided an in-depth analyses of Australian teachers' understanding and perception of the concept of PL. These investigations are a necessary first step towards ensuring that PL is received, interpreted, and appropriately translated from theory into educational practice. Our findings suggest that Australian teachers are aware of PL, albeit with often limited understanding/narrow interpretations of the concept. A *lack of understanding/partial understanding* of PL has become a consistent finding featured among the few studies that have reported on teacher understanding of PL (Robinson, Randall, and Barrett 2018; Harvey and Pill 2018; Stoddart and Humbert 2017; Lynch and Soukup 2016; Stanec and Murray-Orr 2011; Stoddart and Humbert 2021). This highlights the urgent need for better dissemination/education around PL and a closer collaborative process between researchers and policymakers in order to clarify the concept to teachers. This may ensure that children are being provided with rich authentic experiences that can develop their PL. Although teachers in this study maintained several scepticisms (e.g. PL as a 'buzzword') regarding the concept, they generally appreciated the value, importance, and applicability of PL, and were willing to implement its concepts in their teaching. However, teacher understanding of PL was found to be intertwined with PL implementation. To assist PL's implementation within schools, teachers have suggested the need for curriculum alignment (e.g. explicit reference to PL in the curriculum); resources, training, and professional development opportunities in PL; and policy changes (e.g. mandates from educational bodies such as the Department of Education). Critical barriers that could hinder such PL's implementation were further identified including time constraints; teacher workload and busyness; lack of funding; personal factors; lack of prioritization of PE in

schools; fundamental movement skills focused teaching; and the lack of accountability afforded to PE teachers. While some of these barriers are institutional (i.e. outside the control of teachers) and would require considerable negotiation and strong leadership to overcome, other teacher-related barriers could be ameliorated by equipping teachers with proper knowledge on PL and its implementation. Finally, the responsibility for developing children's PL extends beyond HPE teachers. Others, including school senior leadership, parents, as well the community (e.g. local government council), play an equally contributory role. Further research into the level of awareness, understanding, and buy-in/support for the PL concept by *others* (such as school senior leadership, parents) would be interesting and relevant.

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Authors' contributions

IE, JS, NL, MD, EE and LB conceptualized the study and contributed to the study design. IE was responsible for the data collection, quantitative data analysis and drafted the initial manuscript. IE, EW and NL performed the qualitative data analysis. All authors reviewed, and approved drafts of this manuscript including the final version.

Ethics approval and consent to participate

All participants provided written consent prior for study participation. This study was approved by the Deakin University Human Research Ethics Committee (HEAG-H 101_2019) and Coventry University Ethics Committee (P292390).

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

ORCID

Inimfon A. Essiet  <http://orcid.org/0000-0003-2065-0935>

Elyse Warner  <http://orcid.org/0000-0002-1759-2183>

Natalie J. Lander  <http://orcid.org/0000-0002-0279-3724>

Jo Salmon  <http://orcid.org/0000-0002-4734-6354>

Michael J. Duncan  <http://orcid.org/0000-0002-2016-6580>

Emma L. J. Eyre  <http://orcid.org/0000-0002-4040-5921>

Lisa M. Barnett  <http://orcid.org/0000-0002-9731-625X>

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