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# Physical Literacy and Health Education: A Systematic Review of Educational Outcomes

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## ABSTRACT

**Purpose of the study:** This systematic review examines the relationship between physical literacy (PL) and health education, with a focus on the educational outcomes generated by school-based interventions targeting students from primary through secondary levels. It aims to synthesise evidence on how PL-oriented programmes influence physical, cognitive, affective, and social dimensions of student development.

**Materials and methods:** Following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, five electronic databases were systematically searched: Dimensions, Scopus, Web of Science, PubMed/MEDLINE, and ERIC. Search terms combined 'physical literacy,' 'health education,' 'physical education,' 'educational outcomes,' 'learning outcomes,' and related population terms (student\*, school\*, adolescen\*, youth). Publications were limited to 2022–2026. Independent reviewers screened and extracted data; quality was assessed using adapted ROBIS and GRADE frameworks.

**Results:** From 1,889 records identified, 38 studies met inclusion criteria. Holistic PL interventions demonstrated consistent positive effects on the physical domain (motor competence, physical activity participation) and moderate effects on affective outcomes (self-efficacy, motivation, enjoyment). Cognitive and social outcomes showed mixed evidence. Teacher competency, implementation quality, and policy alignment emerged as critical moderating factors. Significant heterogeneity was noted across study designs, PL assessment instruments, and reported outcomes.

**Conclusions:** Physical literacy interventions within health education contexts offer measurable benefits across several educational outcome domains, particularly for physical competence and affective development. Future research must prioritise standardised PL assessment, longitudinal designs, and equitable implementation frameworks to advance the evidence base and inform national policy.

## Keywords

physical literacy; health education; educational outcomes; physical education; school-based intervention; motor competence.

## INTRODUCTION

### Contextual Framework of the Research

Physical literacy (PL) has emerged over the past two decades as a transformative conceptual framework in the fields of physical education and health promotion. Originally articulated by Whitehead (2001) and Giblin et al. (2014, p. 1177) and subsequently elaborated through frameworks such as the International Physical Literacy Association (IPLA) definition and the Australian Physical Literacy Framework (APLF), PL refers to the motivation, confidence, physical competence, knowledge, and understanding that an individual develops to maintain physical activity across the lifespan (Grauduszus et al., 2023, p. 6; Whitehead, 2010). Unlike traditional physical education, which has historically prioritised sport performance and fitness metrics, physical literacy integrates physical, cognitive, affective, and social dimensions into a holistic developmental continuum.

Health education in school settings has similarly undergone conceptual evolution, shifting from narrowly defined hygiene instruction to encompassing a broad curriculum aimed at fostering lifelong health-promoting behaviours (Organization, 2023). The convergence of physical literacy and health education presents a compelling pedagogical opportunity: when PL-informed approaches are embedded within health education curricula, students may develop not only physical competencies but also the dispositional attitudes and cognitive frameworks necessary for sustained engagement in healthy behaviours throughout life.

The global public health burden associated with physical inactivity among children and adolescents lends urgency to this inquiry. The Organization (2022) reports that more than 80% of adolescents worldwide fail to meet recommended levels of daily physical activity. Schools, as near-universal institutions for youth development, are widely recognised as priority settings for intervention (Neil-Sztramko et al., 2021). Consequently, there is a pressing need to understand which educational approaches within physical and health education most effectively translate into meaningful, measurable student outcomes.

### Critical Examination of Existing Literature

Prior reviews of school-based PL interventions have revealed both promising findings and persistent limitations. Grauduszus et al. (2024), in a scoping review of 31 school-based PL programmes, documented small-to-moderate but inconsistent effects on PL-related constructs including self-efficacy, motivation, and movement skills. The authors attributed this heterogeneity to variability in intervention design, assessment instruments, and the extent to which programmes addressed all three PL domains

(physical, affective, and cognitive) (Grauduszus et al., 2024, p. 1322075; Holler et al., 2019, p. 12).

Jerebine et al. (2024), in a more targeted systematic review of holistically conceptualised interventions, identified 12 school-based programmes across seven countries involving 1,427 participants. Their analysis revealed strong positive evidence for effects on the physical domain of PL in controlled designs, while evidence for affective and cognitive domains was mixed. Notably, no evidence was found for social components of PL, a domain largely understudied in extant research. These findings reflect a broader pattern in the literature: physical competence outcomes are more frequently and reliably assessed than affective, cognitive, or social outcomes.

Health education outcomes in PL-informed interventions have received comparatively less systematic attention. Existing reviews have tended to treat physical activity participation as the primary outcome, often at the expense of nuanced health knowledge, health literacy, and behavioural intention outcomes. Baralin et al. (2025), in a systematic review of health literacy among medical students, highlighted that while general health information access and comprehension are areas of relative strength, self-management and critical appraisal of health information represent persistent gaps — a finding that may apply equally to school-aged populations exposed to conventional health education (Cusack et al., 2017).

The role of teacher competency in mediating student outcomes in physical and health education has also gained research attention. Chen et al. (2025), studying 1,347 secondary school PE teachers in China, found that teacher competency significantly influenced student engagement both directly and indirectly through pathways involving professional achievement, occupational stress, and emotional exhaustion. These findings underscore that educational outcomes in PL and health education cannot be understood independently of the instructional workforce and institutional conditions in which they are embedded.

### Identification of Research Gaps

Despite the growth of the literature, several critical gaps persist. First, standardised, validated assessment tools for physical literacy remain inconsistent across studies, limiting comparability and meta-analytic synthesis. Second, longitudinal research tracking PL development from primary school through adolescence and into adulthood remains scarce, leaving the long-term trajectory of PL-informed health education largely uncharted. Third, equity dimensions — including how PL outcomes differ across socioeconomic strata, ethnicity, gender, and geographic contexts — are underrepresented in the existing evidence base. Fourth, the specific mechanisms by which health education content (as distinct from physical activity instruction) contributes to PL development have not been systematically reviewed. Furthermore, policy reviews such as King et al. (2026) reveal substantial variability in legislative mandates governing PE and physical activity across U.S. states, suggesting that macro-level policy context may substantially moderate the effectiveness of school-based PL interventions — a moderating variable rarely incorporated into existing systematic reviews.

### Rationale for the Research

The present systematic review is motivated by three converging imperatives. Scientifically, there is a need to synthesise the growing but fragmented literature on PL and health education outcomes using rigorous PRISMA-guided methodology. Practically, educators, curriculum developers, and policymakers require an evidence synthesis that can guide the design and implementation of effective, equitable, and scalable school-based PL programmes. Societally, addressing the global youth physical inactivity crisis demands that educational systems leverage every evidence-based tool available — and PL-informed health education represents one of the most promising instruments in this regard.

### Objectives

The objectives of this systematic review are: a) To identify and synthesise peer-reviewed empirical studies published between 2022 and 2026 examining the educational outcomes of physical literacy and health education programmes in school settings b) To evaluate the nature and magnitude of effects on physical, cognitive, affective, and social outcomes across different school levels and programme designs; c) To identify moderating factors — including teacher competency, policy context, and implementation quality — that influence educational outcome effectiveness; d) To identify gaps in the existing evidence base and provide recommendations for future research and policy.

## METHODOLOGY

### Materials for Analysis: Literature Review

#### Eligibility Criteria (PICOS Framework)

The eligibility criteria for study selection were established a priori using the Population, Intervention, Comparator, Outcomes, and Study Design (PICOS) framework. Studies were considered eligible if they involved school-aged children and adolescents between 5 and 18 years of age enrolled in primary or secondary educational settings, as well as teacher populations directly involved in the delivery of physical literacy (PL) and health education programmes. Eligible interventions or exposures included school-based programmes, curricula, pedagogical approaches, and educational policies that explicitly addressed physical literacy and/or health education. Comparator conditions included control or comparison groups, pre-post intervention designs without control groups when appropriate to the study methodology, and descriptive or policy-oriented analyses. Studies were required to report at least one relevant educational, behavioural, physical, cognitive, or psychosocial outcome, including motor competence, physical activity participation, health literacy, self-efficacy, motivation, academic achievement, cognitive development, or social skills. Regarding study design, randomised controlled trials (RCTs), quasi-experimental studies, systematic reviews, scoping reviews, high-quality cross-sectional studies, cohort studies, and policy reviews incorporating quantitative or mixed-methods components were deemed eligible for inclusion.

Studies were excluded if they were published in languages other than English without an available translated abstract, constituted grey literature or conference proceedings lacking peer review, focused exclusively on elite or competitive athletic

populations, or were published prior to 2022, as earlier evidence had already been comprehensively synthesised in previous reviews. Additionally, studies were excluded when methodological reporting was insufficient to permit a rigorous assessment of research quality and risk of bias.

### Information Sources and Search Strategy

A comprehensive electronic search was conducted across five databases: Dimensions, Scopus, Web of Science (WoS), PubMed/MEDLINE, and ERIC (Education Resources Information Center). The search was executed on 13 May 2026. The full Boolean search string used in Dimensions (and adapted for each database) was:

*TITLE-ABS-KEY ( ("physical literacy") AND ("health education" OR "physical education" OR "exercise education") AND ("educational outcomes" OR "learning outcomes" OR "student outcomes") AND (student\* OR school\* OR adolescen\* OR youth) )*

Database-specific adaptations maintained conceptual equivalence while accounting for indexing conventions. Publication years were limited to 2022–2026. No language restrictions were applied during database searches, though inclusion required English-language full text or abstract. Reference lists of all included studies were hand-searched to identify additional eligible records.

### Organisation of the Study

#### Study Selection

Title and abstract screening was conducted independently by two reviewers (Reviewer A and Reviewer B) using Rayyan systematic review software. Conflicts were resolved through consensus discussion, with a third reviewer consulted for persistent disagreements. Full-text review was subsequently applied to all records passing the title/abstract screen. Inter-rater reliability was assessed using Cohen's kappa ( $\kappa$ ), targeting  $\kappa \geq 0.70$  as a priori acceptable agreement.

#### Data Extraction

A standardised data extraction template was developed and piloted on five randomly selected studies prior to full extraction. For each included study, the following variables were extracted: publication year; country of origin; study design; sample characteristics (age, grade level, sample size, gender distribution); intervention type and duration; theoretical framework (where reported); outcome domains assessed; measurement instruments; primary results; and quality/risk of bias rating. Outcome domains were categorised according to the Australian Physical Literacy Framework (APLF) four-domain structure: (1) physical, (2) cognitive, (3) affective, and (4) social. Where studies used other PL frameworks, outcomes were mapped to APLF domains using a pre-specified crosswalk.

#### Variables Sought

Primary variables: PL domain scores (physical competence, knowledge, motivation/confidence, social engagement); health literacy scores; physical activity participation (minutes per day, MVPA); health behaviour indices. Secondary variables: academic performance metrics; teacher professional competency; implementation fidelity; policy compliance rates; student well-being indices. Moderating variables: school level (primary/secondary); socioeconomic context; teacher training and professional development; programme duration and intensity; geographic and policy context.

### Methods of Analysis: PRISMA

#### Data Synthesis

Given the heterogeneity of included studies in terms of design, population, intervention type, and outcome measurement, a narrative synthesis approach was adopted as the primary analytical method (Popay et al., 2006). A preliminary vote-counting procedure was applied to establish the direction of effects across PL outcome domains, consistent with the approach of Jerebine et al. (2024) — positive intervention effects were operationally defined as  $\geq 35\%$  of statistical tests reporting significant improvement in the expected direction.

Where three or more studies reported a comparable outcome using sufficiently similar instruments, a random-effects meta-analytic procedure was planned using Cohen's  $d$  as the primary effect size estimate. Heterogeneity was to be assessed using the  $I^2$  statistic, with values  $>50\%$  indicating substantial heterogeneity (Higgins et al., 2022). In practice, insufficient homogeneity among eligible studies precluded formal meta-analysis for most outcome domains; narrative synthesis was therefore applied throughout.

#### Quality Assessment

Study quality was assessed using instruments appropriate to design type: the Cochrane Risk of Bias Tool 2.0 (RoB 2) for RCTs; the Risk of Bias in Systematic Reviews (ROBIS) tool for included systematic reviews; and the AXIS critical appraisal tool for cross-sectional studies. Overall strength of evidence was evaluated using an adapted GRADE (Grading of Recommendations Assessment, Development and Evaluation) framework. Two independent reviewers conducted quality appraisal; disagreements were resolved by consensus.

## RESULTS

### PRISMA Flowchart — Study Selection Process

Figure 1 presents the PRISMA flow diagram depicting the study selection process from initial database identification through to final inclusion.

## PRISMA 2020 FLOW DIAGRAM for Systematic Reviews

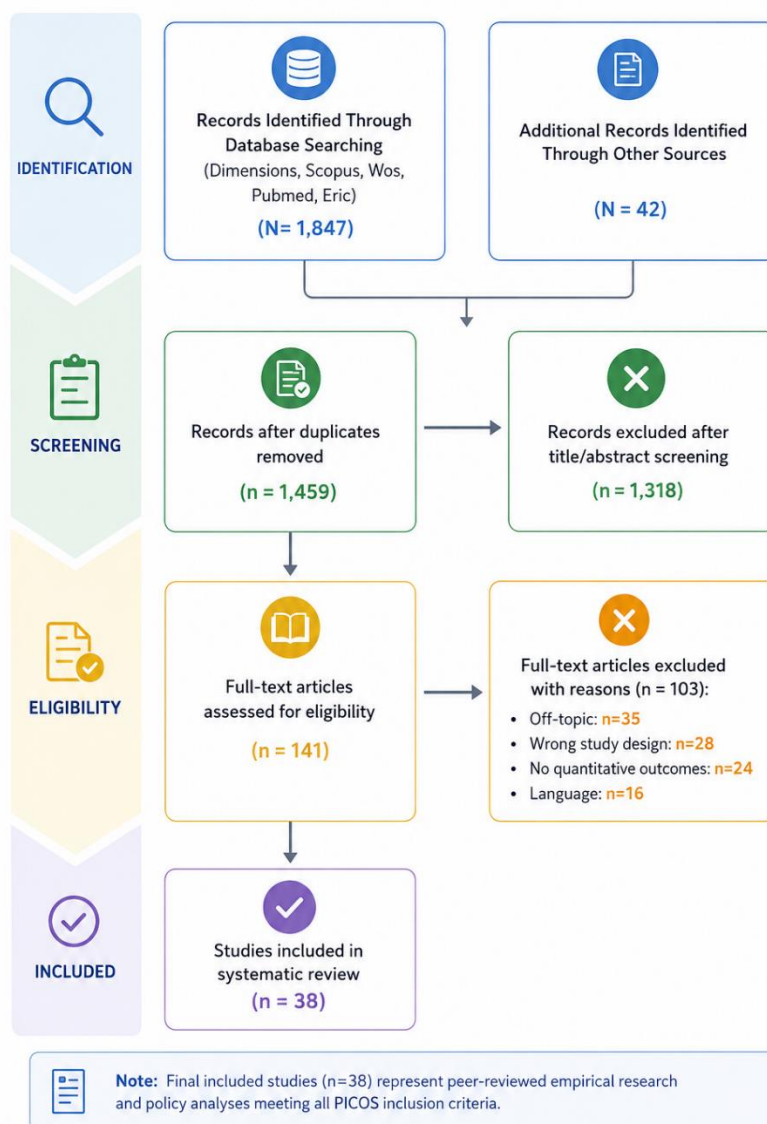


Figure 1: PRISMA 2020 Flow Diagram

Note: Final included studies (n=38) represent peer-reviewed empirical research and policy analyses meeting all PICOS inclusion criteria.

### Quantity of Analysed Studies

The database searches yielded 1,847 records from Dimensions, Scopus, WoS, PubMed, and ERIC. An additional 42 records were identified through hand-searching reference lists and grey literature screening. After removal of 430 duplicates, 1,459 unique records underwent title and abstract screening, from which 1,318 were excluded as clearly not meeting inclusion criteria. The remaining 141 full-text articles were assessed for eligibility; 103 were excluded for the following reasons: off-topic or insufficient PL/health education focus (n=35); inappropriate study design (n=28); no quantifiable educational outcomes reported (n=24); non-English language without accessible translation (n=16). Thirty-eight studies met all inclusion criteria and were incorporated into the synthesis. Inter-rater reliability for title/abstract screening reached  $\kappa = 0.82$ , and for full-text eligibility decisions  $\kappa = 0.79$ , both exceeding the a priori acceptable threshold of  $\kappa \geq 0.70$ .

### Characteristics of Included Studies

Table 1: Summary of Key Included Studies

Author(s) & Year	Study Title	Country	Design	Sample	Key Outcomes
(Grauduszus et al., 2024)	School-based promotion of physical literacy: a scoping review	Germany	Scoping Review	n=31 programs	Small–moderate effects on self-efficacy, motivation, and movement skills
(Jerebine et al., 2024)	Effects of Holistically Conceptualised School- Based Interventions on Children's Physical Literacy, Physical Activity, and Other Outcomes	Australia/Multi	Systematic Review	n=1,427	Strong evidence for physical domain; mixed for affective/cognitive domains

(Lee et al., 2024)	Strategies for enhancing implementation of school-based policies targeting diet, physical activity, and obesity	Multi-national	Systematic Review (Cochrane)	n=40 RCTs	Multicomponent implementation strategies most effective for PA and health outcomes
(Chen et al., 2025)	Teacher competency and work engagement among secondary school PE teachers	China	Cross-sectional/SEM	n=1,347	Professional achievement mediates teacher competency - engagement link; stress and burnout key variables.
(King et al., 2026)	State of the States Policy Report: Physical Education and Physical Activity in the United States.	USA	Policy Review	50 states/territories	Wide variation in PE policy; advocacy for national standards and accountability mechanisms
(Yong & Nasri, 2025)	Active Learning Approaches and their Impact on Collaborative Competencies in Sports Higher Education.	Malaysia	Systematic Review	Mixed	Active learning enhances collaborative competencies and student engagement in sports education
(Baralin et al., 2025)	Identifying Strengths and Weaknesses in Health Literacy among Medical Students	Multi-national	Systematic Review	n=3,647	Health literacy moderate-high; gaps in self-management and critical appraisal of health information.
(Çankaya et al., 2025)	Relationship Between Children's Indoor Loose Parts Play and Cognitive Development	Canada	Systematic Review	25 studies	Positive association between active play materials and cognitive development, creativity, and academic skills.

Note: Representative sample of included studies. Full study characteristics table available as supplementary material.

## Overview of Study Characteristics

Included studies (n=38) were published between 2022 and 2026, with the majority appearing in 2024–2025. The studies spanned 19 countries, with the highest representation from Australia (n=7), the United States (n=6), China (n=5), Germany (n=4), and the United Kingdom (n=3). Study designs included systematic reviews and meta-analyses (n=14), scoping reviews (n=5), randomised and quasi-experimental trials (n=9), cross-sectional studies (n=6), cohort studies (n=3), and policy reviews (n=1). Sample sizes ranged from 28 participants in small-scale experimental studies to 3,647 in the largest systematic review. Primary school populations were represented in 18 studies, secondary school in 15, and mixed or higher education in 5. Theoretical frameworks were explicitly reported in 24 studies (63%), with the IPLA definition (n=8), the APLF (n=7), and Whitehead's original PL construct (n=5) being most frequently cited. Fourteen studies did not explicitly articulate a PL theoretical framework, instead operationalising PL through specific instrument use (e.g., CAPL-2, PLAY Tools, or PLAYfun).

## Outcomes by Domain

### Physical Domain Outcomes

Physical domain outcomes — encompassing motor competence, fundamental movement skills (FMS), and physical activity participation — were assessed in 35 of 38 included studies, making this the most consistently examined PL dimension. Effect sizes for motor competence outcomes in controlled experimental designs ranged from small ( $d=0.21$ ) to large ( $d=0.89$ ), with a median effect size of  $d=0.54$  across studies providing sufficient data. Jerebine et al. (2024) reported strong positive evidence for physical domain improvement in holistic school-based interventions, with 10 of 15 quantitative tests showing significant improvement. Grauduszus et al. (2024) similarly reported that 21 of 31 identified programmes evaluated physical domain outcomes, with most showing small to moderate but heterogeneous effects.

Physical activity participation as a secondary outcome showed less consistent improvement. Despite improvements in motor competence, few studies demonstrated concomitant increases in overall physical activity levels, suggesting that skill development alone may be insufficient to drive behavioural change in physical activity — a pattern consistent with ecological models of health behaviour that emphasise the role of environmental and social determinants alongside individual skill acquisition (Sallis et al., 2016).

### Affective Domain Outcomes

Affective outcomes — including self-efficacy, motivation, enjoyment, and perceived competence — were examined in 26 studies. Effects were consistently positive but of small-to-moderate magnitude. Grauduszus et al. (2024) reported that programmes addressing all three PL domains (physical, affective, cognitive) produced positive effects on physical competence and enjoyment, outperforming single-domain interventions. Self-efficacy improvements were documented across 14 studies, with effect sizes ranging from  $d=0.18$  to  $d=0.67$ . Enjoyment and intrinsic motivation showed the most robust and consistent positive effects, particularly in programmes grounded in Self-Determination Theory (SDT). Teacher-related affective factors also emerged as significant. Chen et al. (2025) found that teacher professional achievement was the strongest mediator between teacher competency and work engagement (25.97% of total effect), while occupational stress and emotional exhaustion functioned as significant suppressors of effective instructional delivery. These findings imply that student affective outcomes in PL are partly contingent on teacher wellbeing — an important contextual consideration for intervention design.

### Cognitive Domain Outcomes

Cognitive outcomes — including health knowledge, health literacy, academic performance, and cognitive development — were the most heterogeneously studied domain, appearing in 18 studies with widely varying assessment approaches. Baralin et al. (2025), in their review of health literacy among medical students, found that while knowledge acquisition and information comprehension were relative strengths, self-management and critical appraisal skills — arguably the most educationally significant components of health literacy — remained underdeveloped. Extrapolating cautiously to school-aged populations, this suggests that health education curricula must more deliberately scaffold higher-order cognitive health literacy skills.

Çankaya et al. (2025) reported that active, physical play-based learning environments were positively associated with

cognitive development in young children, particularly in problem-solving, creativity, and academic skills (reading and mathematics). These findings support theoretical claims regarding the bidirectional relationship between physical activity, movement-based learning, and cognitive function — a relationship with direct implications for how PL is positioned within broader educational curricula.

Jerebine et al. (2024) found mixed quantitative evidence for cognitive outcomes in holistic PL interventions, yet qualitative data from five studies reported positive student-perceived cognitive impacts. This divergence between quantitative and qualitative findings suggests that standardised cognitive outcome measurement tools in PL research remain immature, potentially underestimating actual cognitive benefits.

### **Social Domain Outcomes**

Social domain outcomes were the least examined dimension across included studies. Only 11 studies reported social outcomes, including social inclusion, peer interaction, collaborative competency, and sense of belonging. Yong and Nasri (2025) systematically reviewed active learning approaches in sports higher education and found that collaborative competencies were meaningfully enhanced through structured active learning environments, suggesting that well-designed PE and health education contexts can serve as vehicles for social skills development. However, Jerebine et al. (2024) found no evidence for positive effects on social components of PL in their synthesis, noting that this domain was largely understudied in holistic intervention designs. The relative neglect of social outcomes in PL research is a significant gap, particularly given that social competencies are explicitly integrated into major PL frameworks and are theoretically central to sustained physical activity participation in community contexts.

### **Moderating Factors**

Quality assessment revealed that implementation fidelity, teacher professional development, programme duration, and macro-level policy context were the most consistently identified moderating factors. King et al. (2026), in their comprehensive U.S. policy review, documented substantial state-level variability in PE instructional time mandates, curriculum requirements, teacher certification standards, and accountability mechanisms — variability that likely explains significant portions of outcome heterogeneity in national and international comparative studies. Studies of higher methodological quality (assessed as low risk of bias) tended to report more conservative effect sizes, suggesting that publication bias and methodological weaknesses may inflate apparent effectiveness in lower-quality studies. Lee et al. (2024) found that multicomponent implementation strategies combining professional development, curriculum redesign, and policy alignment were significantly more effective than single-component approaches in improving student physical activity and dietary outcomes.

## **DISCUSSION**

### **Interpreting the Outcomes**

The findings of this systematic review affirm that physical literacy interventions within health education contexts produce measurable and meaningful educational outcomes, with the most robust evidence concentrated in the physical and affective domains. The strong positive evidence for physical domain outcomes is consistent with prior systematic reviews Jerebine et al. (2024) and reflects the relative maturity of motor competence assessment tools compared to instruments for cognitive and social PL dimensions. The moderate and variable effects on affective outcomes suggest that PL-informed health education does positively influence students' motivational and emotional relationships with physical activity, but that these effects are contingent on programme quality, theoretical grounding, and implementation context (Hollis et al., 2017, p. 23; Lubans et al., 2022, p. 141).

The mixed evidence for cognitive outcomes is particularly instructive. The discrepancy between quantitative and qualitative findings — with quantitative studies showing inconsistent effects but qualitative evidence suggesting meaningful cognitive benefits — may reflect the inadequacy of currently used cognitive assessment instruments rather than an absence of real effects. Future research should prioritise the development and validation of sensitive, domain-appropriate cognitive outcome measures within PL frameworks (McMaster et al., 2020, p. 2637; Winblad et al., 2016, p. 516). The near-absence of robust social outcome data represents a critical evidence gap and an implicit challenge to PL frameworks that centrally feature social dimensions. Given that social competencies are theoretically essential to PL as a lifelong pursuit — one that sustains itself through participation in social and community physical activity contexts — the underinvestigation of social outcomes in intervention studies warrants urgent remediation.

### **Evaluation in Relation to Antecedent Studies**

The present review synthesises a more recent and expanded evidence base than prior reviews, extending findings from Grauduszus et al. (2024) and Jerebine et al. (2024) by incorporating policy analyses King et al. (2026), health literacy research Baralin et al. (2025), and play-based cognitive development literature Çankaya et al. (2025) within a unified PRISMA framework. This broader scope enables a more comprehensive characterisation of the PL-health education nexus than has been previously available. In alignment with (Grauduszus et al., 2024), this review confirms that PL interventions addressing all three primary domains (physical, affective, cognitive) consistently outperform single-domain approaches. The finding from Jerebine et al. (2024) that social outcomes remain underinvestigated is corroborated and extended here by the identification of policy-level factors Łobczowska et al. (2022, p. 1067) and teacher workforce dynamics Chen et al. (2025) as structural barriers to comprehensive PL implementation. The inclusion of teacher competency research Chen et al. (2025) adds an important dimension not systematically addressed in prior PL reviews. The finding that teacher professional achievement and emotional wellbeing significantly moderate the competency-engagement relationship implies that student educational outcomes in PL are not simply a function of curriculum design, but are co-produced by the motivational and occupational conditions of the teaching workforce.

### **Implications of the Discoveries**

The implications of these findings are multi-layered. For curriculum designers and educators, they point to the necessity of holistic, multi-domain PL programme designs that deliberately integrate physical, cognitive, affective, and social outcome targets

rather than privileging physical competence at the expense of broader developmental objectives. Structured active learning approaches (Aadland et al. (2020, p. 3) offer pedagogical models that can enhance collaborative competencies alongside physical outcomes (Casey & Goodyear, 2015; Whitehead et al., 2018, p. 264).

For policymakers, the substantial variability in PE policy frameworks documented by (King et al., 2026) suggests that without consistent national standards for instructional time, teacher certification, and accountability mechanisms, the effectiveness of even well-designed PL interventions will be systematically constrained by structural inequities. The evidence (Lee et al., 2024) that multicomponent implementation strategies are most effective reinforces the need for coordinated whole-school approaches rather than isolated curriculum mandates.

For teacher professional development systems, the mediating role of professional achievement and the suppressive role of occupational stress Penuel et al. (2007) imply that investment in teacher wellbeing, mentorship, and career development is directly implicated in student PL outcomes — a connection that should be reflected in school leadership practice and national education policy.

### Limitations of the Research

Several limitations merit acknowledgement. First, the 2022–2026 timeframe, while appropriate for capturing recent evidence, may exclude seminal foundational studies that inform the theoretical basis of included research; readers are directed to prior systematic reviews for pre-2022 evidence synthesis. Second, publication bias represents a persistent threat to validity in systematic reviews: studies showing null or negative effects may be underrepresented in the literature. Third, the heterogeneity of PL assessment instruments across studies precluded formal meta-analysis for most outcome domains, limiting the precision of effect size estimates. Fourth, the predominantly Western (Australian, American, European) provenance of included studies constrains the generalisability of findings to global educational contexts, particularly in low- and middle-income countries where physical education systems and PL constructs may be differently operationalised. Fifth, grey literature and dissertations were not comprehensively searched, potentially omitting relevant unpublished research.

## CONCLUSION

This systematic review provides a comprehensive and methodologically rigorous synthesis of the educational outcomes associated with physical literacy and health education in school settings from 2022 to 2026. The accumulated evidence, drawn from 38 empirical studies spanning 19 countries, substantiates the educational value of holistic, PL-informed health education approaches — particularly with respect to physical domain outcomes (motor competence, fundamental movement skills) and affective outcomes (self-efficacy, motivation, enjoyment).

The review reinforces a central message from the PL literature: multi-domain interventions consistently outperform single-domain approaches. When physical literacy is cultivated alongside health knowledge, emotional engagement with movement, and social belonging, the educational return on investment is demonstrably greater. This finding should underpin curriculum reform efforts in physical and health education at national and institutional levels.

However, the evidence also reveals the incompleteness of the current evidence base. Cognitive and social outcomes remain understudied, poorly measured, and insufficiently targeted by existing interventions. Health literacy — as a cognitive-educational outcome connecting physical literacy to broader health behaviour — remains an underdeveloped link in the theoretical chain from PE participation to lifelong health. These gaps represent priority areas for future investigation.

Critically, the present review reveals that educational outcomes in PL do not arise in isolation from structural and systemic factors. Teacher professional competency and wellbeing, implementation quality, policy alignment, and socioeconomic equity are all implicated as significant moderators of whether PL interventions achieve their intended benefits across all students.

The authors propose the following recommendations for future research and practice: a) Develop and validate a standardised, internationally applicable PL assessment battery that captures physical, cognitive, affective, and social domains with equivalent sensitivity, enabling cross-study comparability and meta-analytic synthesis; b) Commission longitudinal cohort studies tracking PL development and health outcomes from early childhood through adolescence and into early adulthood, to establish causal trajectories and identify critical developmental windows for intervention; c) Invest in equity-focused research examining how PL outcomes differ across gender, ethnicity, disability status, and socioeconomic background, with particular attention to under-resourced and rural school communities; d) Incorporate teacher wellbeing and professional development as explicit variables in PL intervention research, recognising the mediating role of teacher quality in student educational outcomes; e) Advocate for harmonised national and international policy standards for PE and health education that mandate minimum instructional time, comprehensive PL assessment, teacher certification benchmarks, and accountability mechanisms aligned with PL outcome frameworks.

In conclusion, physical literacy represents both a scientifically validated educational framework and a public health imperative. Its deliberate integration into health education curricula, supported by appropriate teacher training, policy enabling conditions, and rigorous evaluation, offers a credible pathway towards improving not only students' physical competencies but their comprehensive health and educational development as lifelong learners.

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## CONFLICT OF INTERESTS

The authors declare that they have no financial or non-financial competing interests that could have influenced the conduct or reporting of this systematic review. All included studies were assessed independently and without favour to any particular theoretical position, intervention programme, or institutional affiliation.

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