Teacher Competence and Readiness for Classroom-Based Assessment in Physical and Health Education: A Systematic Literature Review

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ABSTRACT

Physical Education and Health Education (PEHE) subjects play a vital role in fostering students' physical, cognitive and social development, yet their effectiveness relies heavily on teachers' ability to implement classroom-based assessment (CBA) systematically and authentically. Despite ongoing reforms in assessment practice, concerns remain about teacher competence and readiness in applying CBA within PEHE. This study synthesizes current evidence on (i) the level and dimensions of teacher competence, including knowledge, skills, and attitudes and (ii) the readiness of teachers to plan, implement and evaluate CBA in PEHE. A systematic literature review (SLR) was conducted following PRISMA guidelines. 20 peer-reviewed articles published between 2021 and 2025 were retrieved from Scopus, Web of Science, and ERIC databases, meeting strict inclusion and quality assessment criteria. Data were extracted and thematically analyzed to identify patterns related to teacher competence, readiness, technology integration and implementation challenges. Findings indicate that teachers generally have limited knowledge and skills in assessment, especially in applying CBA practices within PEHE. Teacher readiness levels were reported as low to moderate and were strongly influenced by workload, policy clarity, and the quality of professional development. Sustained and collaborative professional development emerged as a consistent enabler, while digital assessment tools showed promise but were constrained by infrastructural and digital literacy gaps. Structural barriers, including limited resources, policy-practice misalignments, and the undervaluing of PEHE, were consistently identified across contexts. This review contributes to theory by advancing a multidimensional perspective of assessment literacy that integrates cognitive, affective and contextual elements. It further informs practice and policy by underscoring the need for integrated strategies that combine teacher preparation, professional development, systemic reform and digital innovation to strengthen CBA in PEHE and improve student learning outcomes.

Keywords— Assessment literacy, Classroom-based assessment, Physical education and health education, Teacher competence, Teacher readiness

INTRODUCTION

Physical education and health education (PEHE) is widely recognized as a cornerstone in promoting students' physical, mental, and social development. These subjects not only emphasize the mastery of motor skills and health knowledge but also build health literacy that serves as the foundation for lifelong well-being. The effectiveness of PEHE teaching is closely tied to the ability of teachers to implement classroom-based assessment (CBA) in ways that are systematic, consistent, and aligned with curriculum objectives. Over the past decade, the landscape of educational assessment has undergone notable shifts with global research trends showing a move away from summative, examination-oriented practices to more authentic, interactive and continuous formative approaches. This shift has been accelerated by educational reforms and technological innovations, which have positioned CBA as a more dynamic and student-centered method of evaluating learning [8], [36], [46].

Within this global research trend, CBA has been positioned as a mechanism to strengthen student-centered

learning and ensure alignment between teaching and curriculum goals. Yet, concerns remain about teachers' competence and readiness to operationalize CBA effectively, particularly in performance-based subjects such as PEHE where assessment involves physical observation, performance evaluation and systematic documentation. Evidence from recent studies suggests that although teachers may hold positive views about assessment, they often face challenges in applying assessment procedures consistently and confidently [26], [48]. These challenges point to a critical gap between policy aspirations and classroom realities.

The importance of examining teacher competence and readiness for CBA is therefore twofold. On the one hand, it responds to global calls for more effective and authentic forms of assessment that improve student learning. On the other, it provides insights into the specific demands of PEHE, a discipline where assessment literacy requires contextual sensitivity and higher levels of professional judgment. Despite a growing body of work on assessment literacy, there has been limited synthesis of how teachers' knowledge, skills, and attitudes interact with their readiness to implement CBA in PEHE. Existing systematic reviews in assessment research have often focused on general subjects or theoretical constructs, leaving a gap in understanding the unique complexities of performance-based disciplines. Accordingly, this study is guided by two central research questions that frame its scope and analysis:

1. What is the levels and dimensions of teacher competence (knowledge, skills and attitudes) in implementing classroom-based assessment for Physical Education and Health Education subjects?

2. What is the level of teacher readiness to plan, implement and evaluate classroom-based assessment (CBA) in Physical Education and Health Education, and what factors influence their readiness?

The concept of assessment literacy has emerged as a central theme in the discourse on teacher competence. Defined as the integration of knowledge, skills and attitudes towards assessment practices, assessment literacy determines the extent to which teachers can design, interpret and apply assessments to support learning effectively [17], [33]. Research consistently shows that deficiencies in assessment literacy compromise the quality of PEHE instruction, leading to lower levels of student engagement and limited development of healthy literacy [7], [32]. Unlike theoretical subjects, PEHE requires teachers to assess motor skills, physical performance, and behavioral outcomes, which demand higher levels of professional judgment and competence [4], [15], [38].

While assessment literacy is widely acknowledged, teachers' readiness to apply CBA practices remains uneven. Studies reveal that teachers often demonstrate positive attitudes towards assessment reforms but struggle to implement practices effectively due to gaps in knowledge and procedural skills [10], [35], [43]. This lack of readiness contributes to inconsistent application of assessment strategies, limited use of authentic performance-based tasks, and insufficient feedback to support student development [5], [40]-[41]. Such inconsistencies illustrate that readiness requires more than positive dispositions and must be supported by robust competence and sustained opportunities of practice.

Teacher readiness is not only a matter of individual competence but it is also influenced by systemic and contextual conditions. Factors such as workload, lack of resource availability, administrative pressure, and the quality of professional training received directly shape the extent to which teachers can engage with CBA [3], [9], [29]. For PEHE teachers, additional barriers arise from the specific demands of performance-based learning, including the need for specialized equipment, adequate space and difficulties in systematically documenting student progress [14], [18], [23]. These differences render generic approaches to assessment training inadequate; instead, professional development strategies tailored to meet the specific needs of the physical and health education context are necessary [28].

Efforts to strengthen teacher competence through professional development have shown mixed outcomes. Sustained and collaborative training has been associated with improved assessment literacy and enhanced teacher confidence, yet the translation of training into classroom practice remains limited [1], [12], [21]. This gap between training and practice reflects broader systemic issues, including weak follow-up mechanisms, insufficient support structures, and a lack of clarity in policy implementation [23], [42]. Furthermore, the current body of literature has largely addressed competence dimensions in isolation, neglecting the

interdependence between knowledge, skills and attitudes and their influence on readiness. This fragmented approach reinforces the need for systematic reviews that capture the holistic nexus between competence and readiness.

The existing body of literature reveals a notable absence of comprehensive reviews that specifically examine teacher competence and readiness for CBA in the PEHE subject. While earlier reviews have primarily focused on assessment literacy in general education, limited attention has been given to how these constructs apply within performance-based disciplines that present distinctive pedagogical and assessment challenges. Moreover, much of the current research has tended to overlook the influence of contextual and systemic factors in shaping teacher readiness, thereby underestimating the complex interaction between individual competence and institutional conditions. By synthesising evidence across multiple dimensions and critically analysing both enabling and constraining factors, the present systematic reviews seek to fill this gap and offer a more integrated understanding of how teachers can be better supported in implementing CBA effectively within PEHE contexts.

METHODS

Eligibility Criteria

This study was conducted using the Systematic Literature Review (SLR) method to synthesize the latest research findings on the competence and readiness of school teachers in implementing classroom-based assessment (CBA) in physical education and health education (PEHE). The SLR approach was selected as it enables the systematic collection, evaluation and synthesis of evidence based on transparent and replicable procedures, thereby minimizing selection bias and enhancing validity [20]. The review process was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which provide a structured framework to ensure transparency, consistency and reproducibility throughout the research process [34].

To ensure alignment with the objectives of this study, the inclusion criteria required that eligible articles focus explicitly on teacher competence, readiness, or assessment literacy in the context of PEHE at the school level and address the dimensions of knowledge, skills, and attitudes. Only empirical or conceptual studies published in peer-reviewed journals and available in full-text form were included with articles written in either English or Malay. To ensure the review reflected contemporary trends and relevance, only studies published between 2021 and 2025 were considered. Exclusion criteria applied to studies that were not directly relevant to the research objectives, as well as technical reports, conference proceedings or other systematic literature reviews, since these sources may not provide original empirical evidence.

Search Strategy

The literature search was conducted across three major academic databases, namely Scopus, Web of Science (WoS) and ERIC. These databases were selected due to their extensive coverage of peer-reviewed journals in the fields of education and social sciences. The search was restricted to articles published between 2021 and 2025 in order to capture the most recent and up-to-date research in this field. The last search was conducted on 27 July 2025, ensuring that the review reflects the latest available evidence. Search terms were derived directly from the research question, combined using Boolean operators “AND” and “OR” to ensure both breadth and precision. The final search string was: ("classroom-based assessment" OR "formative assessment" OR “authentic assessment”) AND ("physical education" OR "health education") AND (competenc* OR "readiness). The use of truncation, such as competenc*, allowed the retrieval of all relevant variations of the term including *competence*, *competency* and *competencies*. Search syntax was adapted to meet the specific requirements of each database, such as the use of TS= for topic searches in WoS to optimize the retrieval of relevant studies. Further details on the search strategy and keyword combinations for each database are provided in Table 1.

TABLE 1. SEARCH STRING

Database	Search String	Results Retrieved
Scopus	("classroom-based assessment" OR "formative assessment" OR "authentic assessment") AND ("physical education" OR "health education") AND (competenc* OR "readiness)	88
Web of Science	TS=("classroom-based assessment" OR "formative assessment" OR "authentic assessment") AND TS=("physical education" OR "health education") AND TS=(competenc* OR "readiness)	151
ERIC	("classroom-based assessment" OR "formative assessment" OR "authentic assessment") AND ("physical education" OR "health education") AND (competenc* OR "readiness)	181

Study Selection

The article selection process followed the PRISMA steps to maintain transparency and ensure reproducibility (Page et al., 2021). The combined database searches produced a total of 420 initial records. Following the removal of 10 duplicate records, 410 unique articles proceeded to the screening stage. Titles and abstracts were screened for relevance, reducing the pool to 113 articles, of which 35 were excluded for not meeting the established inclusion criteria. The remaining 78 full-text articles were assessed for eligibility. Of these, 58 were excluded because they were out of scope, lacked empirical evidence or did not address the research objectives. Ultimately, 20 articles meeting the specified criteria were retained for the final synthesis. These selected studies employed diverse methodological designs such as quantitative, qualitative and mixed methods that represented a range of geographical contexts, providing a robust and comprehensive evidence base for examining school teachers' competence and readiness in implementing CBA for physical education and health education. Figure 1 visually illustrates the meticulous scrutiny undertaken by the authors across a compilation of 20 publications to extract assertions and materials germane to the subject matter of the present study.

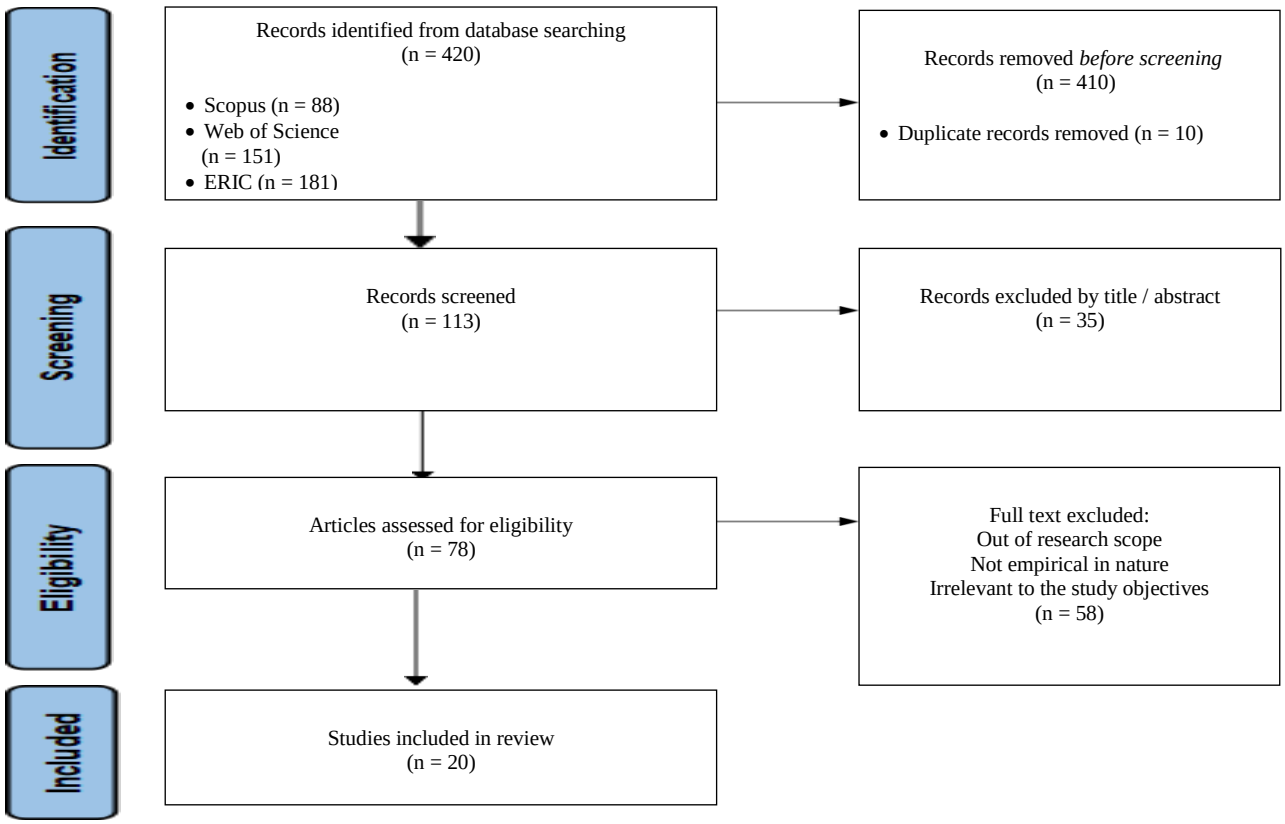

Fig.1 The PRISMA flow diagram.

Quality Assessment

Quality assessment is a crucial process in systematic reviews, as it enables researchers to evaluate the rigor, credibility, and overall quality of individual studies using a structured set of criteria, which in turn informs decisions about their inclusion in the synthesis of findings [20]. In this review, the methodological soundness and contextual relevance of each included study were evaluated against five quality assessment (QA) criteria adapted from established frameworks for educational and social science research [37]. These criteria assessed the alignment of the study with the review's key themes, the clarity of research context, the adequacy of its methodological explanation, the transparency of its data collection process and the accuracy of its data analysis procedures are outlined in Table 2.

TABLE 2. THE FIVE QUALITY ASSESSMENT CRITERIA (QA)

Number of Quality Assessment (QA)	**Questions**
QA 1	Are the topics discussed in the paper related to key/main themes?
QA 2	Is it clear in what context the research was conducted?
QA 3	Is the research methodology sufficiently explained?
QA 4	Is the process and methodology for data collection described in sufficient detail in the paper?
QA 5	Is the data analysis approach evaluated accurately?

Each o**f** the 20 selected articles was independently appraised by two reviewers using a three-point rating scale, where two indicated full compliance with a criterion, one indicated partial compliance and zero indicated non-compliance. The scoring produced a possible range from zero to ten, with studies scoring above six being classified as high quality, those scoring exactly 5 being categorized as medium quality, and those with a score below 5 being considered low quality [30]. To ensure the robustness of the evidence base, only studies exceeding the threshold of five points were included in the final synthesis, thereby ensuring that conclusions were drawn from credible and methodologically rigorous work.

To enhance reliability, all assessments were conducted independently by two reviewers with extensive experience in conducting and supervising numerous systematic reviews. Any discrepancies in scoring were resolved through discussion until consensus was reached. This dual-review process strengthened the transparency and fairness of the evaluation, assuring that the synthesis rests on studies of sufficient quality and methodological integrity.

Data Extraction

The data extraction process was conducted systematically to ensure consistency, transparency and alignment with the research questions of this review. A standardized data extraction form was developed and applied to all 20 articles that satisfied the inclusion criteria. This form facilitated the structured collection of relevant information and minimized the risk of omission or bias [49]. Key details recorded for each article included bibliographic information (author, year, country), methodology, sample, study focus and findings.

To enhance reliability, all assessments were conducted independently by two reviewers with extensive experience in conducting and supervising numerous systematic reviews. Any discrepancies in scoring were resolved through discussion until consensus was reached. This dual-review process strengthened the transparency and fairness of the evaluation, assuring that the synthesis rests on studies of sufficient quality and methodological integrity.

RESULTS

This section presents the report results on the study characteristics, methodological information of the study and consists of four main themes that examined teachers' competency and readiness in implementing classroom-based assessment (CBA), particularly in the context of physical education and health education (PEHE) in schools.

Study Characteristics

We performed a search using predefined search terms. The database search identified 420 records: Scopus (n=88), Web of Science (n=151) and ERIC (n=181). After eliminating any duplicates, 410 records remained eligible for the screening process. Following a thorough review of the abstracts and titles, a total of 78 full-text articles were assessed for eligibility. Of these, 58 were excluded because they were out of scope, lacked empirical evidence or did not address the research objectives. Ultimately, 20 articles meeting the specified criteria were retained for the final synthesis. The majority of relevant studies were retrieved from ERIC (8), followed by the Web of Science (7) and finally Scopus (5) as shown in Figure 2.

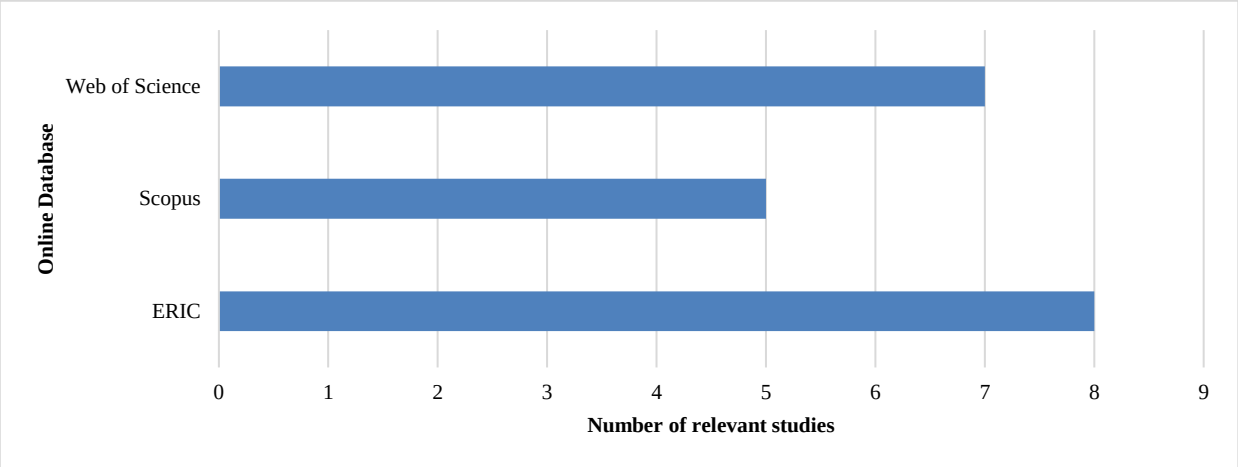

Fig.2 Number of primary studies selected

Methodological Information of the Studies

The methodological landscape of the 20 reviewed studies demonstrates a diverse and balanced use of different research designs in examining teacher competence and readiness for classroom-based assessment (CBA) in Physical Education and Health Education (PEHE) subjects. As shown in Figure 3, quantitative methods were the most common with nine studies (45%), followed by qualitative methodology (35%), while a smaller proportion adopted mixed-method approaches (20%). This indicates a preference for survey-based methods to capture large-scale teacher data, complemented by qualitative and mixed approaches that provide context-rich insights into teachers' experiences.

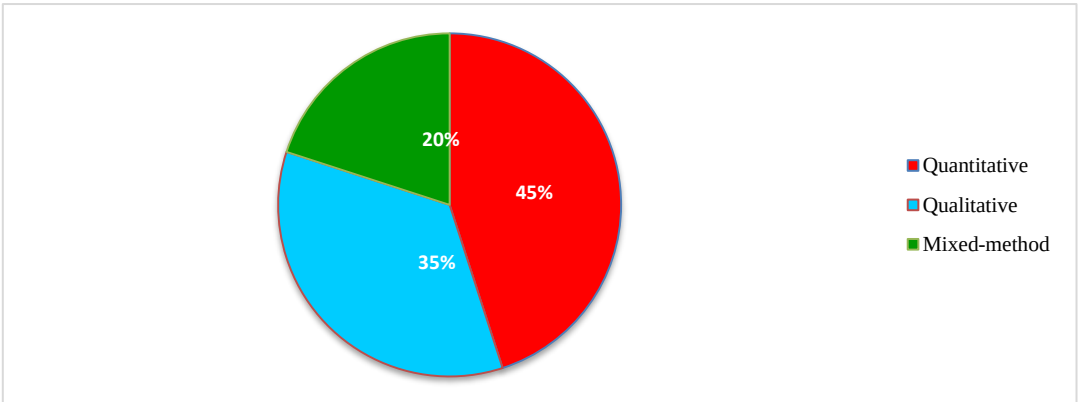

Fig.3 Research methodologies distribution

The distribution of statistical techniques employed across the reviewed studies is shown in Figure 4. Descriptive statistics were the most frequently applied, appearing in nine studies, followed by thematic analysis, which was used in eight studies to generate qualitative insights. Inferential approaches such as ANOVA (three studies), T-tests (two studies) and correlation analyses (two studies) were also evident, reflecting efforts to examine group differences and associations between variables. More advanced modelling techniques, such as structural equation modelling (SEM) and MANOVA, were applied less frequently, appearing in one and two studies, while non-parametric tests, Delphi and inductive content analysis were reported in only a small number of cases. Overall, the findings indicate that the literature is dominated by descriptive and thematic approaches, which provide foundational insights into teacher competence and readiness. However, the limited use of an advanced statistical model suggests that more sophisticated analyses remain underutilised, potentially constraining the ability to capture complex relationships and mediating mechanisms in CBA implementation.

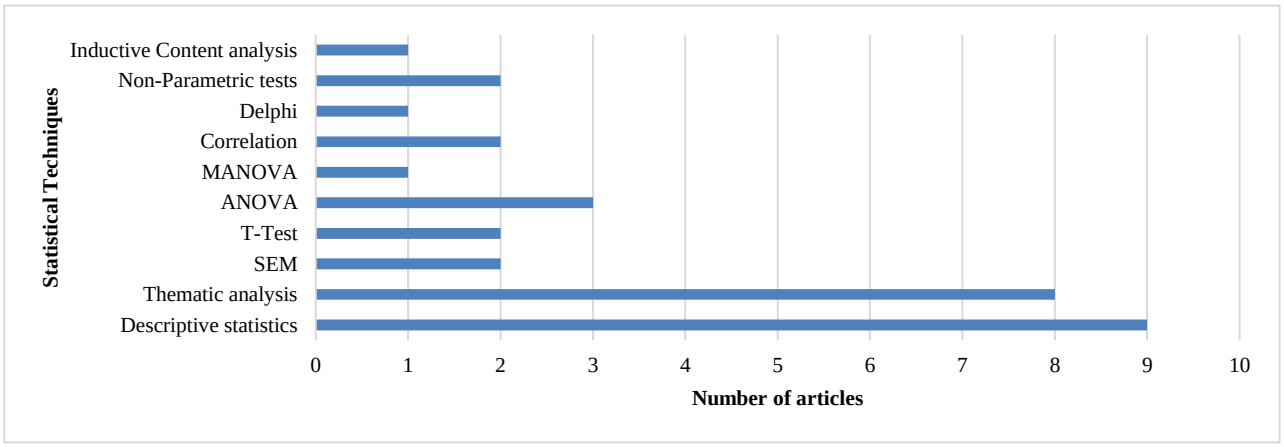

Fig.4 Research statistical techniques distribution

The research on relevant studies covered eleven different countries. The geographical distribution of the reviewed studies is shown in Figure 5. The largest proportion of publications originated from Europe including Finland, Netherlands, Norway, Portugal, Slovenia and Spain, with nine articles and Asia (Malaysia, China, Vietnam and Hong Kong) which contributed eight articles. This distribution highlights that research on teacher competence and readiness for CBA in Physical Education and Health Education has been most actively pursued in Asia and Europe, reflecting stronger scholarly engagement in these regions. A smaller number came from Australia, with three articles, showing emerging but comparatively limited contributions. This pattern suggests that scholarly attention to CBA in PEHE is concentrated in regions with established research infrastructures and policy debates around assessment reform. However, the relatively lower representation from Australia and the absence of studies from other regions, such as North America, Africa or the Middle East, in this dataset highlight the need for broader geographical engagement to capture a more global perspective.

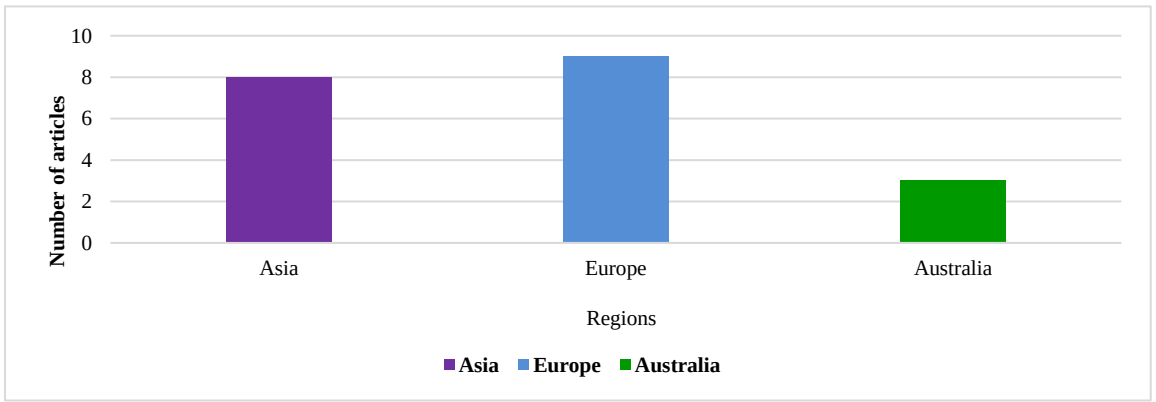

Fig.5 Article published by the region

The quality assessment results (QA1-QA5) of the included studies are summarized in Table 3. All 20 reviewed studies (100%) were classified as high quality, with total scores ranging from 70% to 100%. No studies were rated as medium or low quality. this uniform classification indicates that the overall body of evidence reviewed is methodologically rigorous and reliable. While all studies achieved a high rating, variation was observed in the scoring patterns. Ten studies (50%) achieved the maximum score across all five assessment criteria, indicating a strong methodological design and transparent reporting. Others, while still rated as high, scored slightly lower (70-90%) due to minor limitations such as insufficient detail in data evaluation (QA5). These findings confirm that the synthesis presented in this review is grounded in a strong and credible evidence base, strengthening the reliability of the thematic analysis in the following sections.

TABLE 3. SUMMARIZES THE QUALITY ASSESSMENT RESULTS

Author(s)	**QA1**	**QA2**	**QA3**	**QA4**	**QA5**	**Total Score (Max 10)**	**Percentage (%)**	**Ranking**
Zakaria et al., 2024	2	2	2	1	1	8	80	High
Hernán et al., 2022	2	2	1	1	1	7	70	High
Zhan et al., 2024	2	2	2	2	2	10	100	High
Lam, 2024	2	2	2	2	2	10	100	High
Paakkari et al., 2024	2	2	2	1	2	9	90	High
Ormes et al., 2024	2	2	2	2	2	10	100	High
Tremoen & Lagestad, 2024	2	2	2	2	2	10	100	High
Štemberger & Zurc, 2024	2	2	2	1	2	9	90	High
Slingerland et al., 2024	2	2	2	2	2	10	100	High
Hogan et al., 2023	2	2	2	2	2	10	100	High
Xin & Nasri, 2024	2	2	2	2	2	10	100	High
Hartikainen et al., 2022	2	2	2	2	1	9	90	High
Lei & Man, 2023	2	2	2	1	1	8	80	High
Yusoff et al., 2024	2	2	2	2	2	10	100	High
Macdonald	2	2	2	1	2	9	90	High

et al., 2020								
González-Rivera et al., 2023	2	2	2	2	2	10	100	High
Chen et al., 2025	2	2	2	1	2	9	90	High
Lomsdal et al., 2022	2	2	2	2	1	9	90	High
Silva et al., 2024	2	2	2	2	2	10	100	High
Wee et al., 2021	2	2	2	1	1	8	80	High

To provide a comprehensive overview, the characteristics of the included studies are presented in Table 4 (See Appendix). This table summarizes key information including author, year of publication, research design, sample characteristics, analytical approach, and main findings. Mapping the literature in this way allows for comparison across methodological traditions and geographical contexts, while also highlighting the diversity of approaches used to examine teacher competence and readiness for CBA. The information in Table 4 serves as a foundation for the subsequent thematic analysis, which organizes the findings into four overarching themes aligned to the research questions: (i) teacher competence and assessment literacy, (ii) teacher readiness for CBA implementation, (iii) technology integration in PEHE assessment, and (iv) challenges, barriers and gaps in CBA practice.

Thematic Analysis

The analysis of twenty included studies revealed four overarching themes aligned to the research questions: teacher competence and assessment literacy, teacher readiness in implementing classroom-based assessment (CBA), technology integration in physical education and health education (PEHE) assessment and the challenges and barriers encountered in practice.

Teacher Competence and Assessment Literacy

Nine reviewed studies consistently showed that teacher competence plays a decisive role in the successful implementation of CBA. While most teachers demonstrated a basic understanding of assessment concepts, their ability to design rubrics, apply authentic assessment and align outcomes with curriculum objectives remained uneven. Professional development and institutional support emerged as important enablers, with teachers engaged in structured training or peer collaboration displaying stronger assessment literacy. Overall, the findings highlight a gap between theoretical knowledge and its practical application, particularly in performance-based assessment.

Teacher Readiness for CBA Implementation

Teacher readiness was found to be moderate at best, influenced by workload, experience and the availability of administrative or collegial support. From five reviewed studies, PEHE teachers embedded within professional learning communities reported higher confidence and preparedness compared to those working in isolation. However, across different contexts, time limitations and insufficient resources continued to restrict the full adoption of CBA. The findings underline that readiness is shaped not only by teachers' attitudes and self-efficacy but also by systemic support and school culture.

Technology Integration in PEHE Assessments

Two studies have shown that technology has increasingly been integrated into assessment practices,

particularly through the use of e-portfolios and digital platforms in PEHE assessment. These tools were shown to enhance efficiency and provide more authentic evidence of student learning. Nonetheless, implementation was constrained by issues of digital literacy, infrastructure and access to technical support. While technology presents significant potential to strengthen CBA practices, its success remains contingent on adequate training and reliable infrastructure.

Challenges, Barriers and Gaps in the Implementation of CBA

Persistent barriers were evident across the literature. Four reviewed articles mentioned that teachers cited workload, time constraints and unclear guidelines as major hindrances to effective CBA implementation. Policy-practice gaps and curriculum pressures further limited teachers' ability to apply formative and authentic assessments consistently. In some cases, concerns such as grade inflation and lack of resources undermined the reliability of assessment outcomes. These findings suggest that challenges are multidimensional, encompassing structural, policy and pedagogical issues.

DISCUSSION

Synthesizing the results across the twenty reviewed studies, several consistent patterns emerge that illuminate the broader dynamics of teacher competence and readiness for classroom-based assessment (CBA) in Physical Education and Health Education (PEHE). Teachers generally demonstrate a foundational level of assessment literacy, yet there remains a persistent gap between their conceptual knowledge and their ability to translate this into authentic and curriculum-aligned practice. Readiness levels, though positive in attitudinal dimensions, are frequently undermined by workload, administrative undervaluing of PE and policy-practice gaps. Technology integration offers promising avenues, but its impact is mediated by teachers' digital literacy and instructional support, indicating that innovation alone cannot overcome systemic constraints. Taken together, these findings suggest that competence and readiness though conceptually distinct, are inseparable in practice and are both strongly mediated by institutional support, professional development and policy alignment. The synthesis provides the foundation for the following discussion, which unpacks the findings according to the guiding research questions and situates them within the wider body of literature.

The first research question focused on the level and dimensions of teacher competence in implementing CBA. The reviewed studies consistently demonstrate that teacher competence, particularly assessment literacy, is a critical determinant of effective assessment practices. Teachers were found to possess baseline knowledge of assessment concepts, but practical application remained inconsistent, especially in designing authentic rubrics and linking assessment results to learning objectives [39], [48]. These findings resonate with earlier studies on assessment literacy, which emphasized the global challenge of moving from conceptual understanding to classroom practice [4]. However, divergence emerged when comparing contexts. As [11] reported that Spanish teachers with more experience and at higher teaching levels exhibited systemic planning and assessment, while Malaysian studies revealed gaps in translating knowledge into practice [47]. This variation may be explained by differences in teacher training systems, the strength of curriculum frameworks and institutional support. The evidence thus suggests that competence should be viewed as a socially mediated construct rather than a purely individual attribute. It is not shaped by knowledge and skills but also by the structural environments that enable or constrain practice.

In expanding this framing, assessment literacy should also be conceptualized as socioculturally and institutionally embedded. Teachers' competence is shaped not only by cognitive and technical skills but also by culture, peer collaboration and systemic expectations that either enable or constrain practice [6], [22], [40]. This broader view acknowledges that competence is co-constructed through interaction with institutional contexts and professional communities.

The second research question addressed teacher readiness for CBA implementation. Overall, readiness levels were reported as moderate to low, often constrained by workload, time pressures and limited institutional support [24], [44]. At the same time, positive attitudes towards assessment were consistently noted, such as the findings of [45], who identified high attitudinal readiness among Malaysian teachers despite deficits in

technical knowledge. This indicates that readiness is not uniform but highly context-dependent, shaped by a combination of self-efficacy, prior experience and systemic conditions. Comparative evidence reinforces the conclusion such in Norway, readiness was limited by academic pressures and teacher competence gaps [24], whereas in Spain, [11] found that planning and assessment were more robust among experienced teachers. Such divergence can be attributed to national differences in educational policy and teacher education curriculum. Importantly, across contexts, professional development (PD) consistently emerged as a key enabler. [38] and [39] showed that formative assessment practices improved substantially when teachers engaged in collaborative designed practices, while [14] highlighted that peer mentoring strengthened teachers' confidence in applying assessment. This confirms broader findings in assessment research that PD is most effective when sustained, participatory, and embedded in practice rather than fragmented or one-off [31].

Although not a separate research question, the integration of technology into assessment emerged as a recurrent theme. Studies consistently reported that digital tools such as e-portfolios and online platforms facilitated more efficient assessment and provided authentic evidence of student learning [16], [50]. However, their adoption was uneven, reflecting disparities in infrastructure, access and teacher digital literacy [48]. This divergence mirrors broader debates in educational technology, which argue that the success of innovation depends not only on tool availability but also on pedagogical integration and systemic readiness [33]. The implication is that the technology cannot be assumed to be a universal solution to assessment challenges. Instead, it must be accompanied by policy frameworks, adequate resources and comprehensive teacher training to ensure its effectiveness.

Challenges and barriers were consistently documented across the reviewed studies, cutting across both research questions. Teachers repeatedly identified workload, insufficient time, and lack of resources as barriers that undermined their ability to enact CBA. In Malaysia, the undervaluing of PE within the school system discouraged innovation in assessment practices [44], while in Finland, curriculum pressures were identified as a key obstacle [13]. In addition, systemic issues such as grade inflation and inconsistent feedback practices compromised the reliability of assessment outcomes [42]. These findings highlight that competence and readiness are embedded within broader policy and organisational structures. Even when teachers are individually competent and motivated, systemic barriers can prevent the effective implementation of assessment.

A further observation is the geographical imbalance of existing research. The majority of reviewed studies originated from Asia, Europe and Australia, with minimal representation from Africa, North America or the Middle East. This restricts the extent to which conclusions can be generalized globally and suggests a need for comparative studies that examine teacher competence and readiness in more diverse and underrepresented regions.

The implications of this review extend to theory, practice and policy. Theoretically, the findings suggest that models of assessment literacy must evolve from narrow cognitive frameworks to multidimensional models that integrate affective and contextual components. Teachers' motivation, self-image and perceived control were repeatedly shown to influence practice [6], [22], [40], highlighting the need for frameworks that capture the psychological as well as technical dimensions of competence. At the same time, recognizing the institutional and sociocultural dimensions of assessment literacy ensures that competence is not only conceptualized as an individual trait but also as a systemic outcome shaped by broader educational structures. For practice, the evidence underscores the importance of professional development that is sustained, collaborative and aligned with contextual realities. Professional learning communities, peer mentoring and reflective practice were identified as effective approaches to consolidating competence into readiness [39]. For policy, the findings highlight the urgency of addressing structural constraints, particularly the undervaluing of PE, resource disparities and inadequate digital infrastructure. Without curricular reforms, clearer policy and the introduction of innovative assessment tools, even the most competent and motivated teachers will remain constrained in their ability to deliver effective CBA.

CONCLUSION

This systematic review provides an integrated analysis of twenty high-quality studies examining teacher competence and readiness for classroom-based assessment (CBA) in Physical Education and Health Education (PEHE). The findings demonstrate that while teachers generally possess a foundational level of assessment literacy, significant challenges remain in translating this knowledge into authentic practice. Teacher readiness is similarly constrained, often moderated by workload, administrative undervaluing of PE, and policy-practice gaps, despite evidence of positive attitudes towards assessment. Professional development consistently emerges as the most influential enabler of both competence and readiness, while the integration of technology presents promising opportunities that are nevertheless uneven due to infrastructural and digital literacy disparities.

By addressing the two guiding research questions, this review advances the theoretical understanding of assessment literacy as a multidimensional construct that extends beyond cognitive and technical skills to include affective dispositions and contextual conditions. It also highlights that the competence and readiness are socially and institutionally mediated, shaped by school culture, policy frameworks and sociocultural expectations, not merely by individual teachers' attributes. In practical terms, the evidence highlights the importance of collaborative and sustained professional development initiatives that are adapted to local contexts. At the policy level, the findings underscore the need for systemic reforms that ensure adequate resourcing, equitable digital integration and stronger alignment between curriculum frameworks and classroom realities.

Overall, this review makes three distinct contributions. First, it synthesizes international evidence on teacher competence and readiness for CBA in PEHE, thereby providing a comparative perspective across diverse educational contexts. Second, it highlights the interdependence of competence and readiness, demonstrating that effective assessment practice is contingent not only on what teachers know but also on the structural and institutional support they receive. Finally, it points to the urgent need for integrated approaches that combine professional development, technological innovation, curricular reform, clearer policy alignment and the adoption of innovative assessment tools to bridge the persistent gap between assessment theory and classroom practice.

Limitations and Future Research

Despite providing valuable insights, this review has several limitations that must be acknowledged. First, the geographical distribution of included studies was concentrated in Asia, Australia and Europe, with limited representation from regions such as the Middle East, Africa and North America. This concentration constrains the generalisability of findings to more diverse educational systems and cultural contexts. Future reviews should deliberately include underrepresented regions to build a more balanced global evidence base.

Second, the review relied exclusively on peer-reviewed journal articles, excluding grey literature such as government policy reports, curriculum frameworks, and practice-based documentation that shape teacher competence and readiness. While this ensured methodological rigour, it may have omitted policy-level and practitioner insights that could enrich the analysis. Future reviews should incorporate grey literature to capture the perspectives of policymakers, curriculum designers and practitioners, thereby bridging the gap between research and implementation.

Third, while methodological diversity was observed, the predominance of cross-sectional surveys and qualitative designs restricts the ability to draw causal inferences or capture longitudinal changes in teacher competence and readiness. Future research should adopt longitudinal and experimental designs to trace the evolution of competence and readiness over time, as well as mixed-method approaches to triangulate self-reported data with classroom observations and student learning outcomes.

Fourth, there was an inconsistency in how competence and readiness were operationalised across studies, ranging from rubric-based assessments to self-reported surveys, which complicates direct comparisons. Additionally, reliance on self-reported measures raises the possibility of social desirability bias, potentially

inflating perceptions of teacher capacity. Standardising operational definitions and validated frameworks would improve comparability across studies and contexts. Furthermore, given the increasing importance of digital learning environments, greater attention should be devoted to exploring the role of digital literacy and technology integration in CBA, as these dimensions remain underexplored yet critical to future assessment practices in PEHE.

In sum, while this review consolidates the existing evidence base, it also highlights significant gaps in scope, methodology and conceptualisation that need to be addressed. By engaging these gaps, future research can provide more comprehensive, rigorous and globally relevant insights that strengthen both the theoretical frameworks and practical strategies underpinning classroom-based assessment in Physical Education and Health Education.

RECOMMENDATION

Based on the synthesis of twenty reviewed studies, several practical recommendations emerge to guide policymakers, school leaders and teacher educators in strengthening teacher competencies and readiness for classroom-based assessment (CBA) in physical education and health education (PEHE). Strengthening initial teacher education (ITE) is the priority, as embedding assessment literacy into pre-service programmes ensures that novice teachers enter the profession with both conceptual and practical foundations. [47] highlighted that many teachers begin their careers with a partial understanding of assessment, particularly in physical education and health education (PEHE), which later necessitates remedial professional development.

Equally important is the provision of sustained and contextualized professional development (PD). Short, one-off workshops rarely result in meaningful change, whereas collaborative and practice-linked PD initiatives have been shown to strengthen readiness and confidence [31], [39]. Ministries and schools should therefore invest in ongoing PD cycles that include mentoring, peer learning and reflective practice. While digital assessment tools such as e-portfolios and feedback platforms can enhance assessment practices, infrastructural and literacy gaps remain significant obstacles [16], [50]. Policymakers should ensure equitable access to technology in primary schools, while schools and teacher educators should provide targeted digital training to help teachers integrate technology meaningfully into their assessments.

Systemic and administrative barriers must also be addressed. Resource shortages, undervaluing of PEHE and administrative burden undermine teachers' ability to engage in effective CBA [25], [44]. Governments and schools must allocate adequate time, funding and facilities for PEHE assessment. Additionally, school administrators should recognize PEHE as a core component of holistic education, ensuring that teachers are supported rather than constrained by institutional expectations. Furthermore, curricular reforms should embed CBA principles directly into subject standards and learning outcomes, ensuring alignment between curriculum design and classroom practice [42], [48]. Policy alignment is equally critical and ministries should provide clearer guidelines to reduce the gap between policy aspirations and teachers' classroom realities. Innovative assessment approaches including gamified tasks, AI-assisted feedback and adaptive digital platforms, should be piloted to create more engaging and reliable forms of evaluation, provided that adequate infrastructure and training support are secured [16].

In addition, fostering teacher motivation, well-being and professional identity is essential, as attitudes, stress levels and self-efficacy significantly influence readiness and assessment practices [6], [24]. Supportive leadership, peer mentoring and reflective opportunities are therefore needed to strengthen teacher agency and promote positive professional identities.

Finally, the development of a standardized yet flexible assessment framework is critical. Current inconsistencies in defining and measuring assessment literacy undermine comparability across contexts [42], [48]. Policymakers, curriculum designers and researchers should collaborate to establish validated frameworks that integrate not only cognitive and technical skills but also sociocultural and institutional dimensions of competence and readiness. By addressing competence and readiness through integrated strategies such as teacher development, curricular design, policy alignment, innovative digital tools and teacher well-being can foster a more sustainable ecosystem of assessment practice. Such integrated

approaches are essential to strengthening assessment literacy and enhancing readiness, ultimately leading to higher-quality outcomes in physical education and health education (PEHE).

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APPENDIX

TABLE 4. THE SUMMARY TABLE OF STUDIES

Author (Year)	Country	Methodology	Sample	Analysis	Themes	Findings
Zakaria et al., 2024 [48]	Malaysia	Quant	63 secondary PEHE teachers	Descriptive statistics	Teacher Readiness to Implement CBA (RQ2)	• Gap between curriculum and practice; rubrics preferred; limited use of assessment to inform teaching
Hernán et al., 2022 [14]	Spain	Qual	4 experienced PE teachers	Thematic analysis	Challenges, Barriers and Gaps (cross-cutting, related to both RQs)	• Teacher knowledge and community support are essential; implementation challenges due to structure and workload
Zhan et al., 2024 [50]	Hong Kong	Quant	878 primary teachers	Structural equation modelling (SEM)	Technology Integration in PEHE Assessment (supports RQ1 & RQ2)	• Teacher intention and control predict e-assessment use; e-feedback shaped by norms
Lam, 2024 [21]	Vietnam	Mixed	112 educational administrators, 564 primary school teachers	Descriptive statistics	Teacher Competence & Assessment Literacy (RQ1)	• Identified key dimensions for quality competency assessment and emphasized holistic evaluation. • Emphasized teacher training and school support to improve competency assessment.
Paakkari et al., 2024 [33]	Finland	Mixed	25 HE teachers	Delphi Inductive content analysis	Teacher Competence & Assessment Literacy (RQ1)	• Identified 8 core competency domains for health education teachers, including pedagogy, content knowledge, and continuous professional development
Ormes et al., 2024 [31]	Australia	Mixed	15 HE Teachers + 20 sample assessment tasks	Descriptive analysis	Teacher Competence & Assessment Literacy (RQ1)	• Proposed that a validated rubric is a feasible and adaptable tool for teachers embedding health literacy into assessment practices in HE
Tremoen & Lagest	Norway	Qual	9 PE teachers	Thematic analysis	Teacher Readiness to Implement	• Teachers emphasized formative assessment and student progress, but

ad, 2024 [42]					CBA (RQ2)	expressed uncertainty in grading.

TABLE 4. THE SUMMARY TABLE OF STUDIES (*CONTINU*

Author (Year)	Country	Methodology	Sample	Analysis	Themes	Findings
Štemberger & Zurc, 2024 [40]	Slovenia	Qual	10 PE teachers	Thematic analysis	Teacher Competence & Assessment Literacy (RQ1)	• Identified five themes including impact on self-image and need for fair and motivating assessment
Slingerland et al., 2024 [39]	Netherlands	Qual	15 PE teachers	Atlas.ti (Logbook entries) And thematic analysis (Focus group)	Teacher Competence & Assessment Literacy (RQ1)	• Teachers varied in implementation; key barriers were teacher roles and students' low feedback literacy, and the need sustained approach to effectively implement FA in PE settings. •
Hogan et al., 2023 [16]	Australia	Qual	11 establish leaders, 5 PE teachers, 4 experts in e-portfolios and digital technologies	Inductive thematic analysis	Technology Integration in PEHE Assessment (supports RQ1 & RQ2)	• Three key themes identified included philosophical, pedagogical and pragmatic considerations. E-portfolios effectively supported student engagement and development in PE.
Xin & Nasri, 2024 [45]	Malaysia	Quant	361 Primary school teachers	Descriptive statistics T-Test ANOVA	Teacher Readiness to Implement CBA (RQ2)	• High attitude readiness; moderate knowledge and skills; readiness varies by experience & qualifications
Hartikainen et al., 2022 [13]	Finland	Quant	182 students in 3rd and 5th grades	Chi-square, Spearman's rank order Correlation ANOVA	Challenges, Barriers and Gaps (cross-cutting, related to both RQs)	• Open learning spaces did not increase overall classroom-based physical activity. 5th grades, girls and more breaks occurred in open spaces. Teacher-organized activity increased MVPA;

						restrictive instructions reduced light activity.
Lei & Man, 2023 [22]	China	Qual	12 PE teachers	Thematic analysis	Teacher Competence & Assessment Literacy (RQ1)	• PE teachers' competencies in China encompass personal qualities, knowledge, ethics, PE skills, teaching ability and research/innovation capacity.
Yusoff et al., 2024 [47]	Malaysia	Quant	268 PEHE teachers	MANOVA	Teacher Competence & Assessment Literacy (RQ1)	• Improvements received the highest agreement, while irrelevance received the lowest. No significant gender differences, but teachers with >20 years of experience had significantly different perceptions, suggesting teaching experience influences conception of assessment.
Macdonald et al., 2020 [25]	Australia	Quant	75 educators (classroom teachers, assistant principals, deputy principals, school principals)	Descriptive statistics	Challenges, Barriers and Gaps (cross-cutting, related to both RQs)	• Identified barriers such as insufficient time, limited training opportunities and resources, educators' attitudes towards physical activity and lack of confidence in delivery. Proposed enablers to provide training and resources and foster a supportive school culture.
González-Rivera et al., 2023 [11]	Spain	Quant	499 PE teachers	Descriptive statistics Phi-Coefficient	Teacher Readiness to Implement CBA (RQ2)	• Majority of teachers regularly plan and assess; experience and secondary level teaching increase frequency; tests are the most common tool, homework least; attitudinal aspects are assessed most often.
Chen et al., 2025) [6]	China	Quant	1347 PE teachers	Descriptive statistics T-tests, one-way ANOVA, Correlation and Structural equation modeling (SEM)	Teacher Competence & Assessment Literacy (RQ1)	• Teacher competency strongly predicts work engagement both directly and via reduced stress, lower exhaustion and increased professional achievement with the latter being the most influential mediator; demographic differences were observed, but the model was consistent across genders.

Lomsdal et al., 2022 [24]	Norway	Qual	12 PE teachers	Thematic analysis	Teacher Readiness to Implement CBA (RQ2)	• Teachers perceived time limits, low confidence, uncertain academic benefits and subject-fit challenges as barriers to movement integration with academic pressure and need for enhanced competence being the most prominent issues.
Silva et al., 2024 [38]	Portugal	Mixed	36 students	Descriptive statistics Thematic analysis	Teacher Competence & Assessment Literacy (RQ1)	• Assessment for learning improved engagement, responsibility and understanding; valued feedback and collaboration
Wee et al., 2021 [44]	Malaysia	Quant	248 PE teachers	Descriptive statistics	Challenges, Barriers and Gaps (cross-cutting, related to both RQs)	• Administrators often undervalue PE; limited consultation in duty assignment; lack of discussion on teaching/learning; and few staff training programmes. • More experienced teachers reported slightly more administrative engagement. • Teachers perceived inadequate facilities, equipment, funding and reference materials. • Recommendations included targeted support for younger PE teachers and improved administrative practices.

Note: HE, Health Education; PE/PEHE, Physical (and Health) Education; Quant, Quantitative; Qual, Qualitative; Mixed, Mixed-method