

Developing an Expert-Validated Framework for Improving Online Physical Education in Higher Education

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Abstract:

Background: Sustainable online and blended physical education (PE) requires coordinated solutions that address digital content, teaching organisation, assessment, self-regulated practice, safety, technology, and quality assurance. **Objective:** This study developed and expert-validated a structured set of solutions for improving online PE in a Vietnamese higher-education context. **Methods:** A development-oriented study used evidence from literature review, student survey findings, SWOT/TOWS analysis, and expert consultation. Twenty PE lecturers, coaches, and specialists with experience in online or blended PE were purposively selected. An initial set of 20 solution components was reviewed and restructured into 14 solutions across seven implementation groups. In the second evaluation stage, experts independently rated relevance and feasibility on five-point scales. A solution was retained when both means were at least 3.41, at least 70% of experts selected levels 4–5 for each dimension, and no principled objection was recorded. A high-priority solution required a composite score of at least 4.21 and feasibility of at least 4.00. **Results:** All 14 solutions met the formal retention criteria. Overall relevance was 4.27 and overall feasibility was 4.10. The highest-ranked solution was a safety procedure/checklist for independent practice (composite=4.53; relevance=4.60±0.50; feasibility=4.45±0.60), followed by outcome-aligned online content (4.38) and differentiated tasks/alternative exercises according to space, equipment, health, and student level (4.33). Solutions requiring greater institutional coordination, including LMS standardisation (4.05) and data-informed quality assurance (4.08), remained acceptable but were less feasible. **Conclusion:** Expert validation supported a multidimensional framework rather than a single technological intervention. Safety, outcome alignment, differentiated practice, assessment rubrics, interaction, self-regulation, LMS support, and quality assurance should be treated as interconnected components of online/blended university PE.

Keywords: online physical education; blended learning; expert consensus; feasibility; safety; learning management system; higher education

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1. INTRODUCTION

Online learning in higher education has evolved from a supplementary delivery mechanism into a complex learning environment involving digital resources, interaction, assessment, feedback, and learning management. However, the design problem is particularly difficult in physical education (PE), where intended outcomes include not

only knowledge but also motor performance, independent physical practice, safe exercise, and behavioural engagement.

Evidence from virtual PE has highlighted challenges related to equitable access, technical demonstration, teacher feedback, safety, and the translation of movement-based learning into digital environments [1]. Blended learning provides a potentially more appropriate model because it can combine online preparation, learning resources, task management, and progress monitoring with direct practice, technical correction, and supervised assessment [2,3]. Yet simply adopting a blended format does not specify what institutional and pedagogical components are required.

A useful improvement framework for online PE must therefore address several interactive levels. Content needs to align with course outcomes; videos and digital materials need to support movement learning; assessment needs valid rubrics and procedures; students need support for self-regulation and motivation; independent practice needs safety controls and differentiated tasks; the LMS must support workflow; and institutions need mechanisms for technical support and quality improvement. These components also correspond with broader theories of online learning, teacher technological-pedagogical knowledge, self-regulated learning, and formative assessment [4–7].

The source doctoral study first identified strengths and weaknesses in online PE through student survey data and SWOT/TOWS analysis. It then used expert judgement to convert the identified needs into an implementable solution system. The present article isolates this development and expert-validation phase as a distinct research question, separate from the descriptive student survey and subsequent pedagogical experiment.

The aim was to develop and evaluate a structured framework of solutions for improving online PE in higher education. Specifically, the study sought to: (1) transform identified problems and opportunities into a manageable solution set; (2) organise the solutions into coherent implementation groups; (3) evaluate their relevance and feasibility through expert judgement; and (4) identify priority actions for implementation.

Materials and Methods

Study design

A development-oriented, expert-validation design was used. The solution framework was derived from four evidence streams in the source dissertation: theoretical and empirical literature, findings from a student survey of online PE, SWOT/TOWS analysis, and professional judgement from PE lecturers, coaches, specialists, and managers. The present article reports the framework-development and expert-evaluation stage only.

Expert panel

Twenty PE lecturers, coaches, and specialists with knowledge of and experience in online or blended PE were selected purposively. The panel included 3 participants with doctoral degrees (15%), 14 with master's degrees (70%), and 3 with bachelor's degrees (15%). Professional experience was distributed as follows: less than 3 years, 5%; 3–5 years, 20%; 6–10 years, 50%; and more than 10 years, 25%. Selection emphasised expertise in PE teaching, coaching, management, or direct involvement in online/blended PE.

Development of the solution framework

An initial list of 20 solution components was constructed from the identified problems and proposed improvement directions. Expert feedback on selection, overlap, implementation conditions, risks, responsible units, and priority was then USED to retain, revise, or merge components. Content overlap was reduced by combining closely dependent components. This process resulted in 14 solutions (S01-S14) organised into seven implementation domains (D1-D7): D1, content and digital learning resources (S01-S03); D2, blended teaching organisation and interaction (S04-S05); D3, assessment and technical feedback (S06-S07); D4, self-regulation, peer support, and motivation (S08-S09); D5, safety and differentiated practice (S10-S11); D6, LMS and digital/technical support (S12-S13); and D7, data-informed quality assurance (S14). The English codes S (Solution) and D (Domain) are used throughout this article for international readability.

Expert evaluation and decision rules

Experts rated each final solution separately for relevance and feasibility using five-point scales (1=very low, 2=low, 3=moderate, 4=good, 5=high). For each solution, the analysis calculated the mean, standard deviation, and

percentage of experts selecting levels 4–5 for relevance and feasibility. A composite score was calculated as the arithmetic mean of the two-dimension means, assigning equal weight to relevance and feasibility.

A solution was formally retained when it simultaneously met three conditions: relevance and feasibility mean of at least 3.41; at least 70% of ratings at levels 4–5 for each dimension; and no principled objection. A high-priority solution was defined as having a composite score of at least 4.21 and a feasibility mean of at least 4.00. Ties in composite score were retained as equal ranks; feasibility, percentage of high ratings, prerequisite role, and qualitative implementation comments could be considered when sequencing implementation.

Ethical considerations

The final manuscript should report the exact ethics approval/exemption and consent procedure documented by the institution. The source material available for preparation of this article does not support insertion of a specific approval number, and none has been fabricated.

RESULTS

Final framework structure

The initial 20 components were restructured into 14 solutions in seven implementation groups. The grouping was based on direct objectives, target of action, principal responsible actors, and implementation dependencies rather than being mechanically imposed from the seven survey domains. This produced a framework spanning pedagogy, assessment, learner support, safety, technology, and institutional quality assurance. The integrated structure of the seven domains and their associated solutions is summarised in Figure 1.

To present the final framework in a concise and implementation-oriented form, Table 1 lists the 14 solutions, their corresponding domains, and their primary focus.

Table 1. Final 14-solution framework is organised into seven implementation groups.

Solution / domain	Solution	Primary focus
S01 / D1	Standardise online content according to learning outcomes of each PE course	Content/resources
S02 / D1	Develop specialised digital resources and technique videos integrating common errors, lead-up exercises, alternatives, and safety warnings	Content/resources
S03 / D1	Establish review, updating, version control, and governance of digital learning resources	Content/resources
S04 / D2	Standardise a blended PE model, including content classification, before-during-after sequencing, and increased direct observation/correction	Teaching/interaction
S05 / D2	Improve interaction, technical guidance, counselling, and student support in digital environments	Teaching/interaction
S06 / D3	Develop assessment matrices and rubrics for motor skills aligned with learning outcomes	Assessment
S07 / D3	Standard video assessment, authentication, feedback, technical correction, and process assessment	Assessment
S08 / D4	Develop self-learning capacity through practice logs, progress tracking, reminders, and early warning	Self-regulation/motivation
S09 / D4	Establish peer-support, counselling, and motivation-maintenance mechanisms	Self-regulation/motivation
S10 / D5	Develop procedures, checklists, and guidance to ensure safety during independent practice	Safety/differentiation
S11 / D5	Differentiate tasks and alternative exercises according to space, equipment, health, and student level	Safety/differentiation
S12 / D6	Standardise and improve the online PE classroom environment on the LMS	LMS/support
S13 / D6	Establish technical-support mechanisms and develop digital competence for teachers and students	LMS/support
S14 / D7	Develop data-informed quality assurance, monitoring, feedback, and periodically improvement mechanisms	Quality assurance

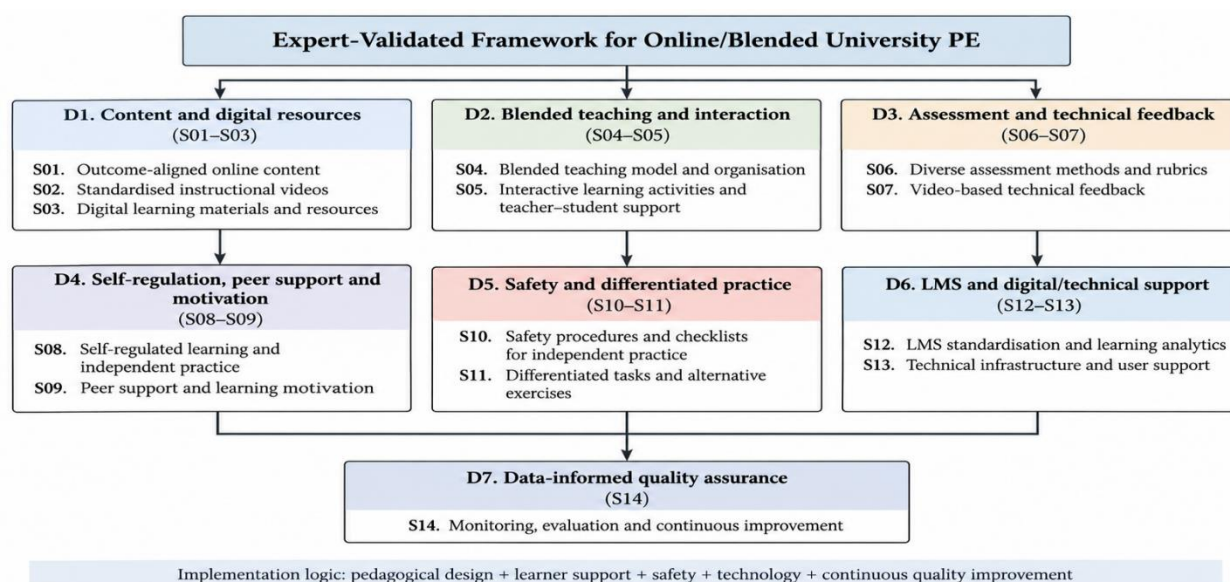


Figure 1. Structure of the expert-validated framework: 14 solutions (S01-S14) across seven implementation domains (D1-D7).

Relevance and feasibility of the 14 solutions

All 14 solutions exceeded the formal retention thresholds. The overall relevance mean (4.27) was higher than overall feasibility (4.10), indicating that experts generally considered the proposed framework important while recognising implementation constraints. Across individual solutions, the proportion of level 4–5 ratings ranged from 80% to 100% for relevance and from 75% to 95% for feasibility.

To compare expert judgements across the proposed solutions, Table 2 summarises the relevance and feasibility ratings, proportions of high ratings, composite scores, and resulting ranks.

Table 2. Expert evaluation of relevance and feasibility of the 14 solutions (n=20).

Code	Relevance M±SD	4–5 (%)	Feasibility M±SD	4–5 (%)	Composite (rank)
S01	4.45±0.60	95	4.30±0.66	90	4.38 (2)
S02	4.35±0.67	90	3.95±0.83	75	4.15 (6)
S03	4.20±0.70	85	4.10±0.72	80	4.15 (6)
S04	4.25±0.72	85	3.95±0.83	75	4.10 (9)
S05	4.20±0.70	85	4.15±0.67	85	4.18 (5)
S06	4.30±0.66	90	4.10±0.72	80	4.20 (4)
S07	4.25±0.72	85	3.95±0.83	75	4.10 (9)
S08	4.15±0.75	80	4.05±0.69	80	4.10 (9)
S09	4.10±0.72	80	4.10±0.72	80	4.10 (9)
S10	4.60±0.50	100	4.45±0.60	95	4.53 (1)
S11	4.35±0.67	90	4.30±0.66	90	4.33 (3)
S12	4.15±0.75	80	3.95±0.83	75	4.05 (14)
S13	4.20±0.70	85	4.10±0.72	80	4.15 (6)
S14	4.25±0.72	85	3.90±0.79	75	4.08 (13)
Overall	4.27	—	4.10	—	—

Priority solutions

S10, the safety procedure/checklist for independent practice, ranked first with a composite score of 4.53. It achieved the highest relevance mean (4.60±0.50), 100% level 4–5 relevance ratings, a feasibility mean of 4.45±0.60, and 95% level 4–5 feasibility ratings. S01, outcome-aligned online content, ranked second (4.38), and S11, differentiated tasks and alternative exercises, ranked third (4.33). These three solutions met the study’s high-priority rule.

S06, the development of outcome-aligned matrices and rubrics for motor-skill assessment, had a composite score of 4.20, narrowly below the predefined high-priority composite threshold of 4.21. S05 scored 4.18. S02, S03, and S13 each scored 4.15. S04, S07, S08, and S09 each scored 4.10.

Relevance-feasibility gap

Several solutions were rated as relevant but somewhat more difficult to implement. S14 had the lowest feasibility mean (3.90), while S02, S04, S07, and S12 each had feasibility means of 3.95. These solutions involve resource development, cross-unit coordination, standardised video/assessment workflows, LMS design, or institution-level quality assurance. Their lower feasibility scores therefore appear to reflect implementation demands rather than rejection of their educational value.

DISCUSSION

The study produced an expert-supported framework that treats online PE as a system rather than a single technological intervention. This is a key finding because practical problems in online PE are interdependent. High-quality videos cannot compensate for weak assessment; an LMS cannot ensure safe independent practice; and student motivation alone cannot replace technical feedback. The final framework therefore links content, pedagogy, assessment, learner self-regulation, safety, technology, and quality assurance.

Safety emerged as the strongest priority. This is theoretically and practically plausible because independent physical practice introduces risks that are less prominent in many other online university subjects. Virtual PE literature has highlighted safety, equitable participation, and appropriate learning tools as central concerns [1]. The expert panel's strong support for S10 suggests that safety should be designed into the online task itself through checklists, warm-up guidance, space and equipment requirements, intensity controls, and clear conditions for stopping or modifying an activity.

The second and third priorities were outcome-aligned content and differentiated practice. Outcome alignment helps prevent online components from becoming disconnected repositories of materials. Differentiated tasks are equally important because students may have different spaces, equipment, health conditions, and skill levels. Together, these priorities indicate that effective online PE should begin with what students are expected to learn and then provide safe, realistic routes for achieving those outcomes.

Assessment was represented by two complementary solutions: outcome-aligned rubrics and a standardised process for video assessment, authentication, feedback, and technical correction. Formative assessment research emphasises the importance of clear criteria and feedback in online learning [6]. In PE, these principles must be adapted to motor performance. Rubrics can make movement criteria explicit, while video can provide evidence for feedback; however, video-based assessment also creates demands related to recording quality, authenticity, file handling, and the limits of remote observation.

The framework also includes self-regulated learning, peer support, and motivation. Online learning requires learners to plan, monitor, and regulate their own progress [7]. Practice logs, reminders, progress tracking, and early-warning functions can make these processes more visible. Peer and teacher support can complement self-regulation by strengthening social and teaching presence, concepts that are central to the Community of Inquiry framework [4].

The relatively lower feasibility of LMS standardisation and data-informed quality assurance is also informative. These components depend on institutional infrastructure, coordination, technical support, and governance rather than on an individual PE instructor alone. Broader e-learning research similarly shows that implementation depends on organisational and technological conditions in addition to pedagogical quality [8,9]. The gap between relevance and feasibility should therefore be interpreted as an implementation-planning signal.

Blended learning provides an organising principle for the framework. The experts supported a model that classifies which activities can be conducted online, which can be blended, and which require direct instruction. This aligns with the broader argument that blended learning can combine the flexibility of digital environments with the strengths of face-to-face interaction [2], and with PE-specific evidence supporting blended approaches [3,10]. For movement-intensive content, direct observation and correction remain important.

The framework should not be interpreted as a universally validated international standard. It was developed within one Vietnamese university context and reflects the evidence and expert judgement available in the source study. Its value lies in providing a transparent, testable structure. Future multi-institutional studies can examine whether the seven groups and 14 solutions remain relevant, whether their priority order changes, and which components independently or jointly improve learning outcomes.

Practical Implementation Framework

A staged implementation sequence is supported by expert ratings. First, institutions can prioritise high-feasibility foundational actions: safety procedures (S10), outcome-aligned online content (S01), and differentiated tasks (S11). Second, assessment of rubrics, interaction, self-regulation tools, and technical support can be standardised. Third, resource-intensive components such as specialised digital repositories, LMS redesign, video-assessment workflows, and institution-wide quality assurance can be developed with cross-unit coordination. This staged interpretation follows the expert relevance/feasibility results; it is not an experimentally tested implementation sequence.

Limitations

The study used a purposive panel of 20 experts from a specific professional and institutional context, so the ratings should not be generalised without caution. Expert consensus indicates professional acceptability, not intervention effectiveness. The relevance and feasibility thresholds were predefined within the source study rather than derived from an external universal standard. Although qualitative comments informed merging and implementation considerations, this article primarily reports on the quantitative expert ratings. Finally, the framework requires empirical testing; the subsequent experiment in the source dissertation addressed selected components, but those outcome data are intentionally reserved for a separate article to avoid overlapping research questions.

CONCLUSIONS

A 14-solution framework across seven implementation groups was developed and supported by expert evaluation for improving online and blended university PE. All solutions met predefined relevance and feasibility criteria. Safety during independent practice, alignment of online content with learning outcomes, and differentiated practice tasks were the highest priorities. The findings indicate that sustainable online PE should be approached as a coordinated pedagogical and institutional system involving content, teaching organisation, assessment, self-regulation, safety, LMS support, digital competence, and quality assurance. Future research should validate the framework across institutions and test the effectiveness of individual components and integrated intervention packages.

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Data availability: The aggregate data supporting the findings of this study are presented in the manuscript and the source dissertation. Individual-level expert-rating data are not publicly available because they contain information collected from participating experts and are subject to confidentiality and data-governance requirements. Additional non-identifiable data may be available from the corresponding author upon reasonable request, subject to applicable institutional and ethical restrictions.

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