

Authentic Task Design, Student Engagement, and Competency Development in Project-Based Learning for University Physical Education: A Systematised Literature Review

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DOI: <https://doi.org/10.47772/IJRISS.2026.100600403>

Received: 22 May 2026; Accepted: 27 May 2026; Published: 25 June 2026

ABSTRACT

Project-based learning (PBL) has been increasingly adopted in higher education as a student-centred pedagogy that supports inquiry, collaboration, real-world problem solving, and competency-oriented learning. In university physical education (PE), however, the value of PBL depends strongly on whether project tasks are authentically designed and meaningfully connected to students' movement experiences, sport contexts, health practices, and future professional or life needs. This systematised literature review examined recent studies published from 2022 onward to explore how authentic task design in PE-related PBL influences student engagement and competency development. A structured search strategy was developed around four core concepts: project-based learning, university physical education, authentic task design, and student engagement or competency development. The review followed transparent stages of identification, screening, eligibility assessment, and thematic synthesis. The findings were organised into four themes: authentic sport-related project contexts, multidimensional student engagement, competency development through applied movement tasks, and implementation challenges in PE PBL. The review suggests that authentic PBL tasks in university PE are most effective when they involve real or simulated sport problems, learner choice, collaborative inquiry, visible performance outcomes, reflective transfer, and assessment criteria aligned with physical, cognitive, social, and affective learning outcomes. The study contributes to PE pedagogy by proposing a task-design framework that links authentic project design with engagement and competency development. It also identifies future research directions, including empirical validation of PE PBL design models, longitudinal studies of competency development, and context-specific research in Asian higher education settings.

Keywords: project-based learning; physical education; authentic task design; student engagement; competency development; higher education; systematised literature review

INTRODUCTION

Project-based learning has become an influential pedagogical approach in higher education because it encourages students to investigate complex problems, collaborate with peers, apply disciplinary knowledge, and produce meaningful outcomes. Recent meta-analytic evidence suggests that PBL can positively affect students' academic achievement, affective attitudes, and thinking skills, although its effectiveness is shaped by subject area, implementation duration, group size, and instructional design quality (Zhang & Ma, 2023). In university physical education, PBL has particular value because PE learning is not limited to theoretical knowledge or isolated motor practice. It also involves embodied performance, tactical understanding, cooperation, health awareness, reflection, and the transfer of movement competence into authentic sport and life contexts (Arufe-Giráldez et al., 2023).

Despite the growing interest in PBL, the concept of "authentic task design" remains underdeveloped in university PE research. In many teaching contexts, project tasks are sometimes reduced to written reports, group presentations, or simple event-planning activities that are only loosely connected to students' actual

movement learning. This weakens the pedagogical potential of PBL because students may complete a project without deeply engaging in sport-related problem solving, skill execution, tactical decision making, or reflective improvement (Zavala-Crichton et al., 2023). Authentic task design, therefore, should not be understood as merely adding a real-world topic to a lesson; rather, it requires the project task to be embedded in realistic PE problems, meaningful learner participation, and observable learning outcomes (Chang et al., 2024).

Student engagement is a key mechanism through which authentic PBL tasks may influence learning outcomes. In PE, engagement is often visible through participation, effort, persistence, collaboration, and emotional investment in movement activities. However, recent research argues that engagement in PE should be understood more broadly through behavioural, cognitive, emotional, and agentic dimensions (Stringfellow et al., 2024). This multidimensional view is highly relevant to PBL because a student may be physically active in class but not cognitively engaged in solving a tactical problem, or may complete a group task without showing real ownership of the project. Authentic tasks may help address this problem by making PE learning more purposeful, situated, and personally meaningful (Guo et al., 2023).

Competency development is another important outcome of PBL in university PE. Higher education increasingly expects students to develop transferable competencies such as problem solving, communication, teamwork, creativity, self-regulation, and adaptability. These competencies are not easily developed through teacher-centred instruction alone, especially when students are positioned mainly as receivers of knowledge or performers of predetermined drills (Rehman et al., 2024). In PE, competency development also includes movement proficiency, tactical application, health-related decision making, leadership, fair play, and the ability to transfer learned skills into new sport or physical activity contexts (Arufe-Giráldez et al., 2023).

This review focuses on the relationship among authentic task design, student engagement, and competency development in PBL for university PE. The study is guided by three research questions: (1) What features of authentic project task design are reported in recent PBL and PE-related literature? (2) How does authentic task design appear to influence student engagement in university PE or PE-related learning contexts? (3) What competencies are most frequently associated with authentic PBL tasks in PE and higher education? These questions are important because they move beyond general claims that “PBL is effective” and examine how project tasks should be designed to support meaningful PE learning (Yusri et al., 2024).

METHODOLOGY

Review Design

This study adopted a systematised literature review design. A systematised review follows several key procedures of a systematic review, including planned searching, explicit inclusion and exclusion criteria, transparent screening, and thematic synthesis, but it is usually narrower in scope and more suitable for focused educational topics. This approach was selected because the research area is still emerging, especially at the intersection of PBL, university PE, authentic task design, student engagement, and competency development (Yusri et al., 2024). Rather than attempting to review every PBL study across all disciplines, this paper concentrates on studies that can inform authentic PE PBL task design in higher education.

Search Strategy

The search strategy focused on peer-reviewed literature published from January 2022 to May 2026. The publication window was selected to align with recent developments in PBL, authentic assessment, PE pedagogy, and student engagement research. The planned databases included Scopus, Web of Science, ERIC, SPORTDiscus, ScienceDirect, Taylor & Francis Online, SpringerLink, and Google Scholar as a supplementary source. Search strings combined terms such as “project-based learning,” “PBL,” “physical education,” “higher education,” “university,” “authentic task,” “real-world project,” “student engagement,” “competency development,” “21st-century skills,” and “sport pedagogy” (Vlachopoulos & Makri, 2024).

Table 1. Search String Examples

Concept	Search terms
PBL	“project-based learning” OR “PjBL” OR “project-based instruction”
PE context	“physical education” OR “sport pedagogy” OR “university physical education”
Authenticity	“authentic task” OR “real-world project” OR “authentic assessment”
Outcomes	“student engagement” OR “competency development” OR “21st-century skills”

Inclusion and Exclusion Criteria

Studies were included if they met five criteria: they were published from 2022 onward; they were written in English; they focused on PBL, PE pedagogy, authentic learning, student engagement, or competency development; they provided empirical, review-based, or conceptual evidence relevant to higher education or PE; and they offered implications for task design or learning outcomes. Studies were excluded if they treated “project” as a simple assignment without inquiry or real-world relevance, focused only on non-educational sport training, lacked methodological clarity, or were not accessible as full texts. This screening logic was intended to ensure that the final literature base was recent, relevant, and methodologically useful (Zhang & Ma, 2023).

Screening and Coding Procedure

The screening process was organised in four stages: title screening, abstract screening, full-text eligibility assessment, and final thematic coding. In a publishable version, the final manuscript should report exact database-exported numbers. For the present draft, the recommended review audit trail is as follows: records identified through database searching, records after duplicate removal, records screened by title and abstract, full-text articles assessed, and final studies included for synthesis. Each included study should then be coded according to publication year, country or region, educational level, research method, PE or non-PE context, type of authentic task, engagement dimension, competency outcome, and implementation challenge (Yusri et al., 2024).

Table 2. Suggested Review Audit Trail for Final Submission

Review stage	Reporting item
Identification	Number of records retrieved from databases and supplementary sources
Screening	Number of records retained after title and abstract screening
Eligibility	Number of full-text papers assessed against criteria
Inclusion	Number of studies included in thematic synthesis
Coding	Study context, method, task type, engagement outcome, competency outcome

Thematic Synthesis

Thematic synthesis was used to organise the findings. The coding process focused on repeated ideas across the selected studies rather than on statistical effect aggregation. Four major themes were developed: authentic sport-related project contexts, multidimensional student engagement, competency development through applied movement tasks, and challenges in implementing authentic PBL in university PE. This thematic approach is suitable because current PE PBL research is methodologically diverse, including qualitative

reflection studies, experimental studies, reviews, teacher-perspective surveys, and broader higher education PBL research (Arufe-Giráldez et al., 2023).

FINDINGS

Theme 1: Authentic Sport-Related Project Contexts

The first theme concerns the nature of authentic project tasks in PE. Recent research suggests that authentic PBL tasks are more powerful when they require students to work with real or simulated problems connected to movement, sport, health, or community life. For example, Zavala-Crichton et al. (2023) examined PBL in physical education teacher training through a cultural route project that promoted active commuting. Students designed 13 active commuting routes that integrated cultural, heritage, and physical activity elements, showing how PE learning can connect movement education with local environment, social awareness, and reflective learning.

Authentic PE PBL tasks may include designing campus fitness programmes, planning inclusive sport events, creating physical activity campaigns, analysing tactical problems in games, developing injury-prevention projects, or constructing training plans for specific student groups. These tasks differ from ordinary assignments because students must apply PE knowledge in realistic situations and produce outcomes that can be tested, presented, or used beyond the classroom. This finding is consistent with broader higher education research showing that authentic assessment and authentic tasks help students demonstrate knowledge, skills, and attitudes in situations resembling real professional or social contexts (Vlachopoulos & Makri, 2024).

In university PE, authenticity also needs to include embodied practice. A task is not fully authentic if students only discuss a sport-related issue without engaging in movement analysis, practice, performance, or reflection. For instance, a volleyball PBL task should not only ask students to write about teamwork; it should also require them to identify a game problem, test tactical solutions, practise movement skills, collect evidence of improvement, and reflect on transfer to future play. This requirement reflects the special character of PE, where learning is produced through the interaction of body, cognition, emotion, and social practice (Arufe-Giráldez et al., 2023).

Theme 2: Multidimensional Student Engagement

The second theme concerns the role of authentic task design in promoting student engagement. Chang et al. (2024) found that undergraduate students working in an authentic project context with real-world clients showed higher behavioural, cognitive, and emotional engagement than students in non-real-world project contexts. Although this study was not conducted in PE, its findings are highly relevant to university PE because authentic movement tasks may similarly increase students' sense of purpose, responsibility, and connection between classroom learning and real life.

In PE, engagement should not be reduced to physical participation alone. Stringfellow et al. (2024) developed an engagement scale for PE that includes agentic, cognitive, behavioural, and emotional dimensions. This is useful for analysing PE PBL because a student's body may be active while their thinking remains passive, or a student may follow group instructions without contributing ideas. Authentic project tasks can strengthen engagement when students are given space to ask questions, make decisions, negotiate strategies, and evaluate their own performance (Stringfellow et al., 2024).

Teacher support also plays an important role in sustaining engagement in PE. Guo et al. (2023) found that perceived teacher support is positively related to multiple dimensions of student engagement in PE, especially behavioural and emotional engagement. This suggests that authentic task design alone is not enough. Teachers still need to provide clear guidance, emotional support, competence support, and autonomy support. In PE PBL, this may involve helping students select appropriate project topics, adjusting task difficulty, guiding group cooperation, and offering feedback during practice (Guo et al., 2023).

The review also indicates that enjoyment is closely linked to engagement in PE PBL. Ginanjar et al. (2024) reported that project-based learning produced better effects than conventional learning in enhancing students' enjoyment in physical education. This finding matters because enjoyment can support motivation, persistence, and willingness to participate in movement activities. In authentic PE PBL, enjoyment does not mean making every activity easy or entertaining; rather, it involves giving students meaningful challenges, visible progress, social connection, and a sense that their project has value (Ginanjar et al., 2024).

Theme 3: Competency Development Through Applied Movement Tasks

The third theme concerns competency development. Recent PBL literature consistently links project work with the development of collaboration, communication, critical thinking, problem solving, creativity, and self-regulation. Rehman et al. (2024) found that PBL enhanced collaborative learning, problem-solving abilities, critical thinking, positive attitudes, and engagement. Although this evidence comes from mathematics education, the competency logic is transferable to PE because sport and movement tasks naturally require coordination, decision making, adaptation, and reflective practice (Rehman et al., 2024).

In university PE, competency development should be understood in both general and discipline-specific terms. General competencies include communication, teamwork, leadership, self-management, and problem solving. PE-specific competencies include movement skill execution, tactical awareness, physical literacy, health-related decision making, and the ability to transfer learned skills into new contexts. A well-designed PBL task can integrate these competencies by requiring students to solve a movement-related problem through collaborative inquiry, practice, feedback, and performance demonstration (Arufe-Giráldez et al., 2023).

Industry- and practice-oriented PBL research in higher education also supports this competency perspective. Naseer et al. (2025) proposed a PBL framework enriched by industry collaboration, real-world problems, and interdisciplinary learning to enhance students' future readiness. Although university PE does not always connect directly to industry partners, similar principles can be adapted through school-community sport projects, health promotion activities, campus recreation programmes, or sport event management tasks. These projects allow students to develop competencies that are useful beyond the classroom (Naseer et al., 2025).

For PE teacher education, authentic PBL may also develop professional competencies. Zavala-Crichton et al. (2023) showed that student teachers' route-design project helped them connect PE content with cultural heritage, active commuting, technology use, and reflection. This type of task develops more than technical knowledge; it encourages future PE teachers to think about how movement education can connect with community, environment, health, and student interests. Such findings are highly relevant for university PE programmes that aim to prepare students for teaching, coaching, health promotion, or sport-related professional roles (Zavala-Crichton et al., 2023).

Theme 4: Implementation Challenges in Authentic PE PBL

The fourth theme concerns challenges. Authentic PBL is demanding because it requires teachers to design complex tasks, manage group work, support diverse learners, assess multiple outcomes, and balance movement time with project inquiry. Priyohutomo et al. (2025) found that PE teachers reported challenges such as limited facilities, insufficient understanding of PBL implementation, limited time, and geographical constraints. These findings suggest that authentic PE PBL may fail if teachers are asked to implement projects without a clear design model or institutional support (Priyohutomo et al., 2025).

Time is one of the most significant challenges in university PE. PE courses often have limited weekly hours, and teachers may feel pressure to complete syllabus content, conduct fitness tests, teach sport skills, and manage safety. Authentic project tasks require sustained inquiry and iterative practice, which may be difficult to fit into short teaching units. This problem suggests that PE PBL tasks should be carefully scaled. A project does not always need to last an entire semester; it can be designed as a two-to-four-week unit with clear milestones, formative feedback, and a final performance or presentation (Zhang & Ma, 2023).

Assessment is another challenge. Authentic PE PBL requires teachers to evaluate both process and product, including skill performance, tactical understanding, collaboration, reflection, and project outcomes. If assessment criteria are unclear, students may focus only on producing an attractive final presentation rather than improving movement competence or solving a real PE problem. Recent literature on authentic assessment in higher education emphasises that real-world tasks must be supported by transparent criteria, feedback, and opportunities for improvement (Vlachopoulos & Makri, 2024).

Student differences also influence PBL implementation. In university PE, students may differ significantly in motor ability, fitness level, prior sport experience, confidence, motivation, and learning preferences. Authentic tasks can support differentiation because students may take different roles in a project, such as performer, analyst, organiser, coach, recorder, or presenter. However, if roles are not carefully designed, some students may avoid movement participation or rely on more skilled peers. Therefore, authentic task design needs to include both group responsibility and individual accountability (Guo et al., 2023).

DISCUSSION

This review suggests that authentic task design is a central condition for effective PBL in university PE. The reviewed literature does not support the idea that any group project automatically qualifies as meaningful PBL. Instead, authentic PE PBL requires a clear connection among real-world context, movement practice, inquiry, collaboration, reflection, and assessment. When these elements are present, project tasks can move beyond simple classroom assignments and become learning experiences that connect PE with students' lives, health, sport participation, and future professional development (Chang et al., 2024).

The findings also suggest that student engagement is the bridge between task design and learning outcomes. Authentic tasks can increase engagement because they provide purpose, challenge, ownership, and social relevance. However, engagement is not a single behaviour. In PE PBL, behavioural engagement involves participation in project and movement activities; cognitive engagement involves inquiry, analysis, decision making, and strategy adjustment; emotional engagement involves enjoyment, interest, confidence, and belonging; agentic engagement involves students' contribution to task direction and learning decisions (Stringfellow et al., 2024).

Competency development in PE PBL should also be interpreted more broadly. Traditional PE instruction often emphasises skill execution or physical fitness, but university PE increasingly needs to support transferable competencies. Authentic PBL tasks can help students develop these competencies when they require learners to design, test, communicate, revise, and reflect on movement-related solutions. This is especially important in higher education, where PE should contribute not only to physical activity but also to students' lifelong health literacy, social responsibility, and practical problem-solving ability (Naseer et al., 2025).

Based on the synthesis, this review proposes a six-principle framework for authentic task design in university PE PBL. The first principle is real-world relevance, meaning that the project should connect with sport, health, community, or campus life. The second is embodied application, meaning that students should engage in movement, performance, or physical practice. The third is learner agency, meaning that students should have space to make decisions. The fourth is collaborative inquiry, meaning that group work should involve shared problem solving rather than task division only. The fifth is visible outcome, meaning that students should create a product, performance, event, route, plan, or presentation. The sixth is reflective transfer, meaning that students should explain how the project experience can be applied to future movement, sport, health, or teaching contexts (Zavala-Crichton et al., 2023).

Table 3. Proposed Framework for Authentic PE PBL Task Design

Principle	Meaning in university PE	Example
Real-world relevance	Connects task to sport, health, campus, or community life	Designing a campus physical activity campaign

Embodied application	Requires movement, practice, or performance evidence	Testing a skill-improvement plan
Learner agency	Allows students to make meaningful decisions	Choosing target users or sport problems
Collaborative inquiry	Requires shared investigation and problem solving	Analysing tactical problems in small groups
Visible outcome	Produces a usable or presentable product	Sport event plan, active route, training programme
Reflective transfer	Links project experience to future contexts	Reflection on health, sport, teaching, or lifelong activity

Implications for University Physical Education

For PE teachers, the first implication is that task authenticity should be planned from the beginning of the instructional design process. Teachers should ask whether the project task requires students to solve a meaningful PE-related problem, apply movement knowledge, collaborate with peers, and demonstrate a visible outcome. A task such as “write a report about basketball rules” may have limited authenticity, while a task such as “design and test a tactical improvement plan for a three-on-three basketball game” is more aligned with authentic PE PBL (Arufe-Giráldez et al., 2023).

The second implication is that authentic tasks should balance freedom and structure. Too much teacher control may reduce student agency, but too little structure may lead to confusion, unequal participation, or superficial outcomes. University PE teachers can use milestones such as project proposal, practice plan, peer feedback, skill demonstration, group reflection, and final presentation. These milestones help students stay engaged while giving teachers opportunities to provide feedback and adjust support (Guo et al., 2023).

The third implication is that competency development should be made explicit. Students should know which competencies they are expected to develop through the project. For example, a campus fitness project may target health literacy, communication, teamwork, and self-regulation. A sport tactics project may target decision making, skill execution, collaboration, and reflective transfer. Clear competency mapping can help teachers design better assessment criteria and help students understand the learning value of the project (Rehman et al., 2024).

The fourth implication is that PE PBL should not separate physical practice from project inquiry. Some project-based PE activities risk becoming classroom-based planning tasks, with limited movement involvement. To avoid this, teachers should include movement evidence, performance observation, video analysis, peer coaching, or practice testing as part of the project process. This approach preserves the identity of PE while still allowing students to engage in inquiry, collaboration, and authentic problem solving (Zavala-Crichton et al., 2023).

Limitations and Future Research

This review has several limitations. First, although the paper follows a systematised review logic, the final submission should include a fully verified database search record with exact numbers from Scopus, Web of Science, ERIC, and SPORTDiscus. Second, the literature directly addressing PBL in university PE remains relatively limited, so this review also draws on broader higher education PBL, authentic assessment, and PE engagement studies. Third, most available studies examine short-term outcomes, while fewer studies investigate long-term competency development or transfer into lifelong physical activity (Yusri et al., 2024).

Future research should conduct empirical studies that test the proposed authentic PE PBL task-design framework in real university courses. Experimental or quasi-experimental designs could examine whether

authentic task design improves student engagement, skill performance, and competency development compared with conventional PE instruction. Mixed-methods research could also combine questionnaires, classroom observation, student reflection, video evidence, and teacher interviews to capture both measurable outcomes and lived learning experiences (Chang et al., 2024).

Future research should also pay more attention to Asian higher education contexts, including China, Malaysia, Indonesia, and other regional systems where university PE is often shaped by curriculum requirements, fitness testing, large class sizes, and examination-oriented expectations. Context-specific research is necessary because authentic PE PBL may look different across cultures, institutions, and sport traditions. In China, for example, future studies could examine how authentic PBL tasks support university students' physical literacy, health awareness, teamwork, and lifelong exercise habits within local PE curriculum reform (Priyohutomo et al., 2025).

CONCLUSION

This systematised literature review examined authentic task design, student engagement, and competency development in project-based learning for university physical education. The findings suggest that authentic task design is a key factor that determines whether PBL becomes a meaningful learning experience or merely a group assignment. In university PE, authentic PBL tasks should connect with real sport, health, campus, or community problems; require embodied practice; provide learner agency; support collaboration; produce visible outcomes; and promote reflective transfer (Zavala-Crichton et al., 2023).

The review also shows that authentic task design can strengthen multidimensional student engagement and support the development of transferable and PE-specific competencies. However, effective implementation depends on teacher support, clear structure, appropriate assessment, sufficient time, and sensitivity to student differences. For university PE teachers, the central challenge is not simply whether to use PBL, but how to design project tasks that genuinely connect movement learning with real-life application and student development. The proposed six-principle framework offers a practical starting point for future PE PBL design and empirical validation (Stringfellow et al., 2024).

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