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Scaffolding in Cooperative Learning for Physical Education Teachers: A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - No support.

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Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 June 2026 and was last updated on 30 June 2026.

INTRODUCTION

Review question / Objective This review integrates Zone of Proximal Development theory, cooperative learning theory, and pedagogical content knowledge into a single analytical framework rather than treating them as parallel but separate lenses. Zone of Proximal Development theory specifies what scaffolding should accomplish for an individual learner. Cooperative learning theory specifies the social structure within which that scaffolding occurs. Pedagogical content knowledge specifies the professional capacity required for a teacher to enact scaffolding appropriately within that structure. Read together, these three perspectives suggest that effective scaffolding in cooperative physical education depends on the alignment of accurate diagnosis of student competence, a cooperative structure that creates genuine opportunities for peer support, and sufficient teacher expertise to coordinate the two. This integrated framework guided both the formulation

of the research questions and the interpretation of findings reported below.

Condition being studied No.

METHODS

Search strategy Six electronic databases were searched for the period January 2000 to September 2025: Web of Science, Scopus, Science Direct, ERIC, ProQuest, and SPORTDiscus accessed through the EBSCO platform.

Eligibility criteria were established prior to the search and required that a study be empirical (using quantitative, qualitative, or mixed methods designs), involve physical education teachers (pre-service or in-service) or students in school based physical education, examine scaffolding behavior occurring within a cooperative learning context, and report teacher behaviors or student outcomes relevant to that scaffolding. Eligible studies were limited to peer reviewed journal articles published

in English between January 2000 and September 2025. Theoretical papers, narrative reviews, opinion pieces, and conference abstracts were excluded, as were studies conducted outside school settings unless they explicitly addressed school based physical education.

Term Cluster 1 included core physical education terms. These were “physical education,” “PE,” “sport education,” “movement education,” and “motor skills.” We also included broader terms like “physical activity,” “exercise,” and “sport” to maximize sensitivity. We filtered these broader terms during screening. We required studies to be conducted in school-based physical education settings.

Term Cluster 2 focused on scaffolding. These terms were “scaffolding,” “scaffold,” “instructional support,” “pedagogical support,” “guided practice,” “zone of proximal development,” “ZPD,” “fading,” and “gradual release.”

Term Cluster 3 covered cooperative learning. These terms were “cooperative learning,” “collaborative learning,” “peer learning,” “group learning,” “team learning,” “social learning,” “peer interaction,” and “group work.” We used Boolean operators “AND” and “OR” to combine these terms.

Participant or population No.

Intervention No.

Comparator No.

Study designs to be included Using quantitative, qualitative, or mixed methods designs.

Eligibility criteria Empirical studies using quantitative, qualitative, or mixed methods approaches.

Information sources Six electronic databases were searched for the period January 2000 to September 2025: Web of Science, Scopus, Science Direct, ERIC, ProQuest, and SPORTDiscus accessed through the EBSCO platform.

Main outcome(s) Search terms were organized into three clusters reflecting the review's central constructs. The first cluster addressed physical education and included the terms physical education, PE, and sport education. The second cluster addressed scaffolding and included scaffolding, zone of proximal development, and ZPD. The third cluster addressed cooperative learning and included cooperative learning, collaborative learning, and peer learning. Terms

within each cluster were combined with the Boolean operator OR, and the three clusters were combined with AND.

Six electronic databases were searched for the period January 2000 to September 2025: Web of Science, Scopus, Science Direct, ERIC, ProQuest, and SPORTDiscus accessed through the EBSCO platform. SPORTDiscus is identified specifically, rather than referring to EBSCO as though it constituted an independent database, because EBSCO is an aggregator platform providing access to multiple distinct databases. The complete search strings, search fields, filters, and dates.

Quality assessment / Risk of bias analysis Three reviewers independently screened titles and abstracts for twenty percent of records, achieving a Cohen's kappa $R=98.56\%$. All remaining disagreements at the full text stage, which involved at least two reviewers per record, were resolved through discussion. The most common reasons for full text exclusion were the absence of a school based physical education context, the absence of cooperative learning as a defining pedagogical feature, and the absence of scaffolding as an identifiable construct.

Study quality was appraised using the Mixed Methods Appraisal Tool (MMAT), selected for its capacity to accommodate the quantitative, qualitative, and mixed methods designs present in the evidence base. Each study was rated High, Moderate, or Low based on MMAT criteria including sampling strategy, measurement validity, attrition, and the appropriateness of analysis, with inter-rater agreement of ninety-five percent and remaining disagreements resolved through discussion. Eight of the eleven included studies were rated High and three were rated Moderate, with no study rated Low. Detailed MMAT ratings appear in Table 2, and Appendix A provides a condensed summary of study characteristics alongside these ratings.

Following full text assessment, eleven studies met the eligibility criteria described in Section 3.1, six assigned to the core evidence set and five to the extended evidence set.

Strategy of data synthesis No.

Subgroup analysis No.

Sensitivity analysis No.

Country(ies) involved China.

Keywords Scaffolding; Cooperative Learning; Physical Education Teachers; Vygotsky's Zone of

Proximal Development theory; pedagogical content knowledge.

Contributions of each author

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