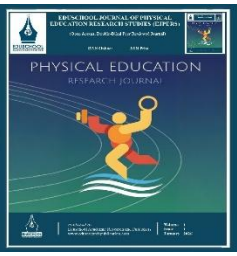
EDUSCHOOL JOURNAL OF PHYSICAL EDUCATION RESEARCH STUDIES (EJPERS)

(Open Access, Double-Blind Peer Reviewed Journal)

ISSN Online: ISSN Print



Peer Teaching and Cooperative Learning on Skill and Social Competence in PE

Amsaveni R

Assistant professor and Research scholar,
Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu.

Article information

Received: 6th January 2026
Received in revised form: 8th February 2026
Accepted: 12th March 2026
Available online: 20th April 2026

Volume: 1
Issue: 1
DOI: https://doi.org/10.5281/zenodo.20132816

Abstract

Peer teaching and cooperative learning represent student-centered pedagogical strategies with significant potential for physical education (PE), yet their combined and independent effects on skill development and social competence among adolescent learners remain inadequately understood. This study investigated the effectiveness of three instructional conditions—peer teaching (PT), cooperative learning (CL), and teacher-directed instruction (TDI)—on motor skill development and social competence in secondary school PE. A randomized controlled trial with 276 students (ages 13–16) across four schools employed a 12-week intervention during badminton and volleyball units. Motor skill proficiency was assessed using validated sport-specific rubrics and the Test of Gross Motor Development-3 (TGMD-3). Social competence was measured through the Social Skills Improvement System (SSIS), peer sociometric ratings, and systematic observation of prosocial behaviors during PE. Results indicated that CL produced the highest gains in social competence ($d = 0.79$, $p < .001$) and comparable skill development to TDI ($d = 0.12$, $p = .42$). PT yielded significant skill gains for both tutors ($d = 0.71$) and tutees ($d = 0.54$), with tutors showing the greatest metacognitive improvements. All student-centered conditions produced higher levels of positive peer interactions compared to TDI. The findings support the integration of peer teaching and cooperative learning as complementary strategies that develop both motor and social outcomes in adolescent PE.

Keywords: - Peer Teaching, Cooperative Learning, Skill Development, Social Competence, Adolescent Physical Education

I. INTRODUCTION

Physical education serves as a unique context for social development, providing opportunities for peer interaction, teamwork, conflict resolution, and leadership within physically active settings (Bailey et al., 2009). However, the extent to which PE fulfills its social development potential depends largely on the instructional structures employed. Teacher-directed instruction (TDI), while efficient for skill transmission, may limit meaningful peer interaction and collaborative problem-solving opportunities that foster social competence (Dyson & Casey, 2016).

Peer teaching and cooperative learning are two student-centered strategies that explicitly leverage social interaction as a mechanism for both cognitive and social learning. Peer teaching involves students taking instructional roles to guide their peers' learning, while cooperative learning structures learning tasks so that students must work together interdependently to achieve shared goals (Johnson & Johnson, 2009). Both approaches align with Vygotsky's (1978) social constructivist theory, which posits that learning is fundamentally a social process mediated through interaction with more capable others.

In PE, peer teaching has been shown to benefit both tutors and tutees. Tutors develop deeper understanding of skills through the process of explanation and demonstration, while tutees receive more individualized attention than is possible in teacher-led instruction (Ward & Lee, 2005). Cooperative learning in PE has been associated with improved skill performance, positive interdependence, and enhanced social relationships (Dyson, 2002). However, most studies have examined these strategies in isolation, and few have directly compared their independent and combined effects on both skill development and social competence in adolescent populations.

This study addresses this gap by comparing peer teaching, cooperative learning, and teacher-directed instruction across both motor and social outcome domains. Adolescence represents a particularly important developmental period for this

investigation, as peer relationships assume heightened significance and social competence becomes increasingly linked to psychological well-being and school engagement (Harter, 2012).

II. LITERATURE REVIEW

2.1. Peer Teaching in Physical Education

Peer teaching in PE encompasses several formats, including reciprocal teaching (Mosston & Ashworth, 2008), cross-age tutoring, class-wide peer tutoring (CWPT), and peer-assisted learning strategies (PALS). The common element is the assignment of instructional responsibility to students, who provide feedback, demonstrate skills, and support peers' learning within structured frameworks.

Ward and Lee (2005) conducted a meta-analysis of peer-mediated instruction in PE, reporting a weighted mean effect size of 0.62 for motor skill outcomes. The analysis revealed that structured peer teaching programs with trained tutors and clear assessment criteria produced larger effects than informal peer interaction. Importantly, tutors often benefited more than tutees, consistent with the 'protégé effect' described in educational psychology literature, whereby the act of teaching deepens the instructor's own understanding (Chase et al., 2009).

Ernst and Byra (1998) examined reciprocal teaching in PE, finding that students in the observer/feedback role developed superior analytical skills and movement understanding compared to those in the performer role alone. This suggests that the observational and communicative demands of peer teaching engage cognitive processes that complement the kinesthetic learning occurring during practice.

However, the quality of peer teaching varies considerably depending on tutor preparation, task structure, and the clarity of observation criteria. Poorly structured peer teaching may result in inaccurate feedback, social loafing, and reinforcement of errors (D'Arripe-Longueville et al., 2002). Effective peer teaching programs require explicit tutor training, structured observation protocols, and teacher monitoring to ensure quality interactions.

2.2. Cooperative Learning in Physical Education

Cooperative learning (CL) is distinguished from simple group work by five essential elements: positive interdependence, individual accountability, promotive interaction, social skills instruction, and group processing (Johnson & Johnson, 2009). In PE, CL structures have been implemented through jigsaw activities, think-pair-share, group investigation, and learning teams approaches (Dyson & Casey, 2016).

Dyson (2002) conducted pioneering research on CL in PE, demonstrating that elementary students in CL conditions showed greater improvement in motor skill performance and more positive social interactions compared to traditionally taught groups. Subsequent work by Dyson and Strachan (2004) confirmed these findings with adolescent learners, noting that CL particularly benefited students who were typically marginalized in PE due to low skill levels or social status.

Casey and Goodyear (2015) conducted a systematic review of CL research in PE, identifying 28 studies published between 1996 and 2014. The review found consistent positive effects on social skills, moderate effects on motor skill development, and emerging evidence for cognitive and affective benefits. The authors noted that implementation quality was a critical moderating factor, with studies reporting high-fidelity CL implementation demonstrating substantially larger effects.

2.3. Social Competence Development Through PE

Social competence encompasses the ability to initiate and maintain positive relationships, cooperate effectively, resolve conflicts constructively, and demonstrate empathy and prosocial behavior (Rose-Krasnor, 1997). In PE, social competence is developed through interactions during partner and group activities, game play, and structured peer learning opportunities (Bailey et al., 2009).

Hellison's (2011) Teaching Personal and Social Responsibility (TPSR) model provides a developmental framework for social outcomes in PE, progressing through levels of irresponsibility, self-control, involvement, self-direction, and caring. While TPSR is typically implemented as a standalone model, its principles can be integrated within peer teaching and CL frameworks to create conditions that simultaneously target motor and social development.

III. METHODOLOGY

3.1. Research Design

A cluster-randomized controlled trial was conducted with classes as the unit of randomization. Twelve classes from four schools were randomly assigned to three conditions (4 classes per condition): peer teaching (PT), cooperative learning (CL), and teacher-directed instruction (TDI). The 12-week intervention covered two sport units: badminton (weeks 1–6) and volleyball (weeks 7–12), with each unit comprising 12 lessons of 50 minutes.

3.2. Participants

A total of 276 adolescent students (148 male, 128 female; ages 13–16, M = 14.4, SD = 1.1) participated. Four PE teachers (2 male, 2 female; mean experience = 9.2 years) each taught one class per condition, controlling for teacher effects. All teachers received specialized training in PT and CL strategies (12 hours) and implemented all three conditions according to detailed lesson protocols.

3.3. Instructional Conditions

Peer Teaching (PT): Students were paired based on complementary skill levels (one higher-skilled, one lower-skilled). Pairs alternated between performer and observer/coach roles within each lesson. Tutors received training in observation skills,

feedback delivery (using criteria cards), and encouragement strategies. Task cards specified key performance criteria for observation and feedback.

Cooperative Learning (CL): Students worked in heterogeneous groups of four, with structured roles (performer, observer, recorder, encourager) that rotated across lessons. The jigsaw method was employed for skill learning (each group member learned one component skill and taught it to the group), and Learning Teams were used for game-play units (teams practiced together toward collective improvement goals). Five CL elements were explicitly structured: positive interdependence (shared group goals), individual accountability (individual skill assessments contributing to group scores), promotive interaction (face-to-face discussion requirements), social skills instruction (explicit teaching of communication, encouragement, conflict resolution), and group processing (end-of-lesson reflection on group functioning).

Teacher-Directed Instruction (TDI): The teacher provided direct instruction following a standard progression: warm-up, skill demonstration and explanation, guided practice, independent practice, and application game. Feedback was provided by the teacher. Students practiced individually or in informal groups without structured peer interaction requirements.

3.4. Measures

Motor skill proficiency was assessed using validated sport-specific rubrics for badminton (clear, drop shot, serve, smash; 0–4 scale per skill) and volleyball (serve, pass, set, spike; 0–4 scale per skill), with total scores calculated for each sport. Inter-rater reliability exceeded .90 for all assessments. The TGMD-3 locomotor and object control subtests were also administered at pre and post.

Social competence was measured through:

- Social Skills Improvement System (SSIS; Gresham & Elliott, 2008), a validated 46-item self-report measuring communication, cooperation, assertion, responsibility, empathy, engagement, and self-control;
- Peer sociometric ratings, where students rated each classmate on a 5-point likert scale for 'most like to work with in PE' and 'best at helping others learn';
- Systematic observation of prosocial behaviors during PE using a time-sampling protocol (10-second observe, 5-second record) coding for encouragement, helping, positive feedback, conflict resolution, and off-task/negative interactions. Two observers achieved inter-observer agreement of 94%.

Metacognitive awareness was assessed using the Metacognitive Awareness Inventory adapted for physical learning (Schraw & Dennison, 1994), including knowledge of cognition and regulation of cognition subscales.

3.5. Data Analysis

One-way ANCOVA with baseline scores as covariates was used to compare post-intervention scores across the three conditions. Planned contrasts compared:

- student-centered conditions (PT + CL) versus TDI, and
- PT versus CL. Within the PT condition, paired t-tests compared tutor and tutee outcomes.

Effect sizes (Cohen's d) were calculated for all pairwise comparisons. Multilevel modeling accounted for nesting within classes. The significance level was set at $p < .05$ with Bonferroni adjustment for multiple comparisons.

IV. RESULTS

4.1. Motor Skill Development

ANCOVA revealed a significant main effect of condition on badminton skill scores, $F(2, 272) = 4.87$, $p < .01$, and volleyball skill scores, $F(2, 272) = 3.94$, $p < .05$. Planned contrasts showed that PT produced significantly greater skill gains than TDI for badminton ($d = 0.48$, $p < .01$) but not volleyball ($d = 0.28$, $p = .11$). CL and TDI did not differ significantly on skill outcomes for either sport (badminton: $d = 0.12$, $p = .42$; volleyball: $d = 0.18$, $p = .24$).

Table 1. Motor Skill Scores by Condition and Sport

Condition	Badminton Pre M(SD)	Badminton Post M(SD)	Volleyball Pre M(SD)	Volleyball Post M(SD)
Peer Teaching	8.4 (2.8)	12.7 (2.1)	7.9 (2.6)	11.4 (2.3)
Cooperative Learning	8.2 (2.9)	11.8 (2.4)	8.1 (2.7)	11.1 (2.5)
Teacher-Directed	8.5 (2.7)	11.5 (2.6)	7.8 (2.5)	10.7 (2.7)

4.2. Tutor vs. Tutee Effects in Peer Teaching

Within the PT condition, tutors showed significantly greater skill improvement than tutees across both sports (badminton: tutor $d = 0.71$, tutee $d = 0.54$, difference $p < .05$; volleyball: tutor $d = 0.63$, tutee $d = 0.48$, difference $p < .05$). Tutors also demonstrated significantly greater metacognitive awareness gains ($d = 0.82$) compared to tutees ($d = 0.41$) and TDI students ($d = 0.28$), confirming the protégé effect.

Table 2. Tutor vs. Tutee Outcomes in the Peer Teaching Condition

Outcome	Tutors M Gain (SD)	Tutees M Gain (SD)	t	p	d (Tutors)	d (Tutees)
Badminton Skills	4.8 (1.9)	3.6 (2.1)	2.84	<.05	0.71	0.54
Volleyball Skills	3.9 (1.7)	3.1 (1.9)	2.41	<.05	0.63	0.48
Metacognitive Awareness	0.68 (0.34)	0.32 (0.38)	4.12	<.001	0.82	0.41

4.3. Social Competence

CL produced significantly greater improvements in overall social competence (SSIS total) compared to both PT and TDI. The effect was most pronounced for cooperation (d = 0.84), empathy (d = 0.72), and communication (d = 0.67) subscales. PT also produced significant social competence gains compared to TDI, particularly in communication and responsibility.

Table 3. Social Competence Scores by Condition (Post-Intervention, Adjusted for Baseline)

SSIS Subscale	CL Post M(SD)	PT Post M(SD)	TDI Post M(SD)	CL vs TDI d	PT vs TDI d	p (overall)
Communication	3.94 (0.58)	3.78 (0.64)	3.41 (0.71)	0.67	0.48	<.001
Cooperation	4.12 (0.52)	3.72 (0.61)	3.38 (0.68)	0.84	0.42	<.001
Assertion	3.68 (0.63)	3.61 (0.67)	3.42 (0.72)	0.34	0.24	.08
Responsibility	3.87 (0.54)	3.82 (0.59)	3.51 (0.64)	0.52	0.48	<.01
Empathy	3.91 (0.57)	3.58 (0.68)	3.34 (0.74)	0.72	0.31	<.001
SSIS Total	3.90 (0.44)	3.70 (0.51)	3.41 (0.58)	0.79	0.47	<.001

4.4. Prosocial Behavior Observations

Systematic observation revealed significantly higher rates of prosocial behavior in CL (M = 8.4 per 10-min observation, SD = 2.1) and PT (M = 6.7, SD = 2.4) compared to TDI (M = 3.2, SD = 1.8). Negative interactions were lowest in CL (M = 0.8, SD = 0.6) compared to PT (M = 1.4, SD = 0.9) and TDI (M = 2.1, SD = 1.3). CL's structured social skills instruction and group processing components appear to create a social environment that both promotes prosocial behavior and reduces negative interactions.

V. DISCUSSION

This study demonstrates that both peer teaching and cooperative learning are effective strategies for developing motor skills and social competence in adolescent PE, with each approach offering distinct advantages. The findings extend previous research by providing direct comparisons between these student-centered approaches and teacher-directed instruction across both skill and social outcome domains.

The skill development findings reveal an important nuance: peer teaching produced superior skill gains compared to TDI, particularly for tutors, while cooperative learning produced comparable skill gains to TDI. This pattern suggests that the one-to-one feedback structure of peer teaching provides more targeted skill support than the group-based CL structure, where individual skill practice may be diffused across multiple social and organizational demands. The protégé effect observed in tutors (d = 0.71–0.82 across outcomes) confirms that the act of teaching is a powerful learning mechanism (Chase et al., 2009). Teaching requires tutors to analyze skill components, articulate performance criteria, observe errors, and formulate corrective feedback cognitive processes that deepen understanding beyond what passive practice provides.

The social competence findings clearly favor cooperative learning, with CL producing substantial effects across communication, cooperation, empathy, and responsibility. This advantage likely reflects CL's five essential elements (Johnson & Johnson, 2009), which explicitly structure positive interdependence and social skills instruction. While peer teaching creates social interaction opportunities, CL's requirement for collective goal achievement and its explicit attention to group dynamics create richer conditions for social skill development. The finding that CL reduced negative interactions more effectively than PT suggests that the social processing component end-of-lesson reflection on group functioning promotes awareness and regulation of social behavior.

The metacognitive advantage of peer teaching, particularly for tutors, has important implications for lifelong physical activity participation. Students who develop strong metacognitive skills the ability to plan, monitor, and evaluate their own learning are better equipped to continue learning independently beyond the school PE context (Zimmerman, 2002). This suggests that peer teaching may contribute to self-regulated learning capacity that extends beyond immediate skill gains.

From a practical standpoint, these findings support the strategic integration of both approaches within PE curricula rather than exclusive adoption of either. Peer teaching may be optimally deployed during skill-focused lesson phases where targeted feedback on specific techniques is the primary objective. Cooperative learning may be most effective during tactical and game-play phases where collaboration, communication, and strategic thinking are central. Teacher-directed instruction retains value for introducing new skills, establishing safety procedures, and providing expert demonstrations.

Limitations include the 12-week duration, which may not capture long-term social development trajectories. The study focused on individual sports (badminton) and team sports (volleyball), but findings may differ for other activity types. The reliance on four teachers teaching all three conditions, while controlling for teacher effects, may have introduced carry-over effects. Future research should examine the long-term retention of social skills developed through CL, the optimal frequency and duration of peer teaching episodes, and the combined use of PT and CL within integrated instructional models.

VI. CONCLUSION

This study establishes that peer teaching and cooperative learning make distinct yet complementary contributions to adolescent development in PE. Peer teaching excels in promoting motor skill acquisition (especially for tutors) and metacognitive awareness, while cooperative learning produces superior social competence outcomes across multiple dimensions. Both approaches significantly outperform teacher-directed instruction in developing prosocial behaviors and positive peer interactions. PE programs should adopt integrated instructional approaches that strategically deploy peer teaching for skill-focused phases and cooperative learning for game and tactical phases, creating comprehensive learning environments that develop the whole student physically, socially, and cognitively. Teacher education programs must prepare pre-service teachers to implement both strategies with fidelity, including tutor training protocols, cooperative learning structure design, and the social skill instruction necessary to maximize the potential of student-centered pedagogy in physical education.

REFERENCES

Bailey, R., Armour, K., Kirk, D., Jess, M., Pickup, I., & Sandford, R. (2009). The educational benefits claimed for physical education and school sport: An academic review. *Research Papers in Education, 24*(1), 1–27.

Casey, A., & Goodyear, V. A. (2015). Can cooperative learning achieve the four learning outcomes of physical education? A review of literature. *Quest, 67*(1), 56–72.

Chase, C. C., Chin, D. B., Oppezzo, M. A., & Schwartz, D. L. (2009). Teachable agents and the protégé effect: Increasing the effort towards learning. *Journal of Science Education and Technology, 18*(4), 334–352.

D'Arripe-Longueville, F., Gernigon, C., Huet, M. L., Cadopi, M., & Winnykamen, F. (2002). Peer tutoring in a physical education setting: Influence of tutor skill level on novice learners' motivation and performance. *Journal of Teaching in Physical Education, 22*(1), 105–123.

Dyson, B. (2002). The implementation of cooperative learning in an elementary physical education program. *Journal of Teaching in Physical Education, 22*(1), 69–85.

Dyson, B., & Casey, A. (2016). *Cooperative learning in physical education and physical activity: A practical introduction*. Routledge.

Dyson, B., & Strachan, K. (2004). The ecology of cooperative learning in a high school physical education programme. *Waikato Journal of Education, 10*, 117–139.

Ernst, M., & Byra, M. (1998). Pairing learners in the reciprocal style of teaching: Influence on student skill, knowledge and socialization. *The Physical Educator, 55*(1), 24–37.

Gresham, F. M., & Elliott, S. N. (2008). *Social skills improvement system rating scales manual*. NCS Pearson.

Harter, S. (2012). *The construction of the self: Developmental and sociocultural foundations* (2nd ed.). Guilford Press.

Hellison, D. (2011). *Teaching personal and social responsibility through physical activity* (3rd ed.). Human Kinetics.

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher, 38*(5), 365–379.

Mosston, M., & Ashworth, S. (2008). *Teaching physical education* (1st online ed.). Spectrum Institute for Teaching and Learning.

Rose-Krasnor, L. (1997). The nature of social competence: A theoretical review. *Social Development, 6*(1), 111–135.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology, 19*(4), 460–475.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Ward, P., & Lee, M. A. (2005). Peer-assisted learning in physical education: A review of theory and research. *Journal of Teaching in Physical Education, 24*(3), 205–225.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*(2), 64–70.