

Effectiveness of Peer Teaching Models in Senior Secondary Schools

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ABSTRACT

Peer teaching—students instructing fellow students in structured roles—has re-emerged as a powerful pedagogical strategy in senior secondary education, where academic rigor and adolescent socio-emotional development intersect. This study investigates the effectiveness of peer teaching models (reciprocal teaching, cross-age tutoring, same-age tutoring, and jigsaw/cooperative structures) in Classes XI–XII across diverse school settings. A mixed-method design was used: an explanatory survey ($n = 320$ students; 40 teachers) measured academic achievement, engagement, self-efficacy, and collaborative skills; follow-up focus group discussions (FGDs) and classroom observations provided qualitative depth. Results show statistically significant gains ($p < .05$) in post-test scores for students exposed to peer teaching compared to traditional teacher-led instruction. Moreover, learners reported heightened motivation, clearer conceptual understanding, and reduced anxiety—especially in STEM subjects. Teachers perceived peer teaching as time-efficient for remediation but pointed to challenges such as uneven participation, role ambiguity, and assessment alignment. The study concludes that peer teaching is an effective, context-adaptable strategy for senior secondary schools if embedded within a well-scaffolded framework, supported by teacher capacity building, and assessed with rubrics that value process as much as product. Recommendations include phased implementation, explicit training in facilitation skills for students, and policy-level recognition of peer instruction as a formal component of instructional time.

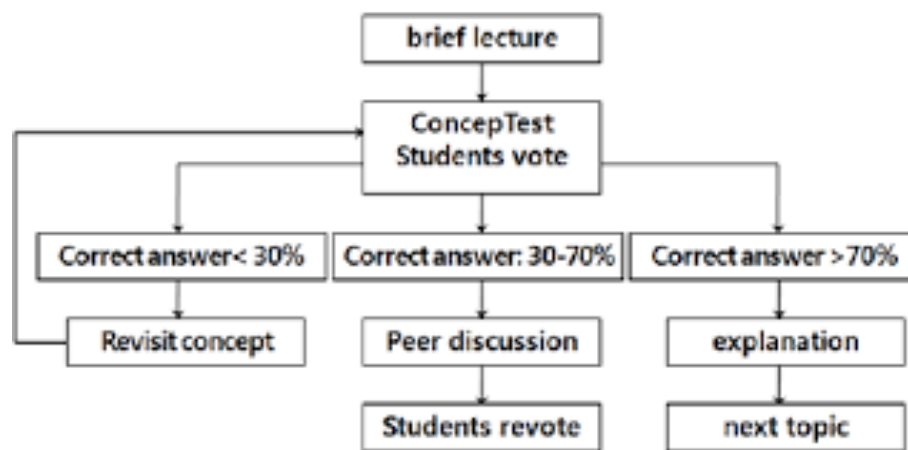


Fig.1 Peer Teaching, [Source:1](#)

KEYWORDS

Peer teaching; senior secondary education; reciprocal teaching; jigsaw method; student engagement; academic achievement; collaborative learning; self-efficacy; formative assessment; teacher facilitation

INTRODUCTION

Background and Rationale

Senior secondary school (typically ages 16–18) is a pivotal stage in which learners must consolidate foundational knowledge while acquiring higher-order thinking skills essential for tertiary education and employment. Traditional teacher-centered instruction, though efficient for content delivery, often struggles to cater to diverse learning paces and styles. In contrast, constructivist and socio-cultural theories emphasize interaction, dialogue, and shared meaning-making as vehicles for deep learning. Peer teaching operationalizes these principles by positioning students as co-creators of knowledge—alternating between the roles of teacher and learner.

Globally, peer-assisted learning strategies (PALS) have demonstrated positive effects on achievement, attitudes, and retention. Yet, contextual factors—curriculum rigidity, exam-centric cultures, class size, and cultural norms regarding authority—shape their efficacy. In many senior secondary contexts, especially in resource-constrained schools, peer teaching can serve both as a pedagogical innovation and a pragmatic solution to teacher workload, large class sizes, and heterogeneous classrooms. The present study explores how peer teaching models function within such contexts and to what extent they influence cognitive and affective outcomes.

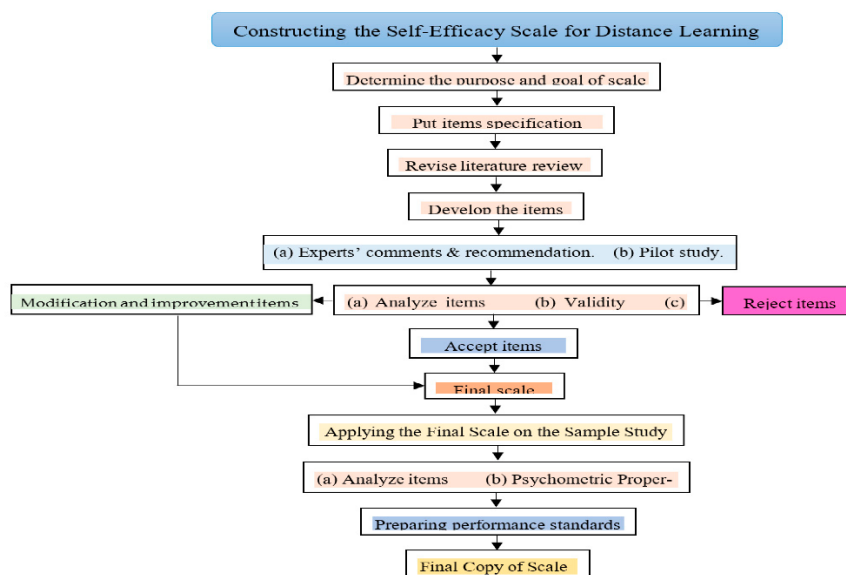


Fig.2 Self-Efficacy, [Source:2](#)

Problem Statement

Despite anecdotal success stories, systematic evidence on peer teaching at the senior secondary level remains fragmented. Questions persist: Which peer teaching models best fit specific subject domains? How do we ensure rigor and accountability when peers teach? What training and support do student tutors require? Without empirically grounded answers, schools risk ad hoc implementation, leading to inconsistent results and potential backlash from stakeholders skeptical of “students teaching students.”

Purpose of the Study

The primary purpose is to examine the effectiveness of peer teaching models in improving academic achievement and learner engagement in senior secondary schools. Secondary purposes include identifying facilitators and barriers to implementation, understanding teacher and student perceptions, and deriving a context-sensitive framework for sustainable adoption.

Research Questions

1. To what extent do peer teaching models influence academic achievement of senior secondary students compared to conventional instruction?
2. How do peer teaching strategies affect students' engagement, self-efficacy, and collaborative skills?
3. What are teachers' and students' perceptions of the benefits and challenges of peer teaching?
4. Which implementation factors (training, group size, assessment methods) significantly mediate the effectiveness of peer teaching?

Significance of the Study

This study contributes to both theory and practice. Theoretically, it extends the application of Vygotsky's Zone of Proximal Development (ZPD) and Bandura's social learning theory to late-adolescent learners. Practically, it provides evidence-based guidelines to school leaders, curriculum planners, and teachers seeking to embed student-centered approaches without compromising exam preparedness.

Scope and Delimitations

The study focuses on Classes XI and XII in selected urban and semi-urban schools. Only four peer teaching models are examined, and cognitive outcomes are measured primarily through subject tests in mathematics, biology, and economics. The survey relies on self-reported engagement and self-efficacy scales, which, while validated, may carry social desirability bias.

LITERATURE REVIEW

Theoretical Foundations

Peer teaching is rooted in socio-constructivism. Vygotsky highlighted the importance of social interaction and scaffolding by more capable peers. Bandura's social cognitive theory posits that observing peers perform tasks enhances self-efficacy and outcome expectations. Johnson and Johnson's cooperative learning theory underscores positive interdependence, individual accountability, and promotive interaction as critical to group-based learning.

Definitions and Typologies

Peer teaching encompasses several formats:

- **Reciprocal Teaching:** Students take turns summarizing, questioning, clarifying, and predicting in reading tasks.
- **Same-Age Tutoring:** Peers of similar age/grade teach each other, often rotating roles.
- **Cross-Age Tutoring:** Older students tutor younger ones; less common in senior secondary due to narrow age bands but appears in mentoring programs.
- **Jigsaw/Cooperative Structures:** Each student becomes an "expert" on a subtopic and teaches it to group members.
- **Peer-Led Team Learning (PLTL):** Structured problem-solving sessions led by trained peer leaders, widely used in introductory college STEM but adaptable to senior secondary.

Empirical Evidence on Academic Outcomes

Meta-analyses (e.g., Topping, 2005; Kunsch et al., 2007) generally report small-to-moderate effect sizes for peer tutoring on achievement. Studies in secondary mathematics (Fantuzzo et al., 1992) and science (Hockings et al., 2008) show improved conceptual understanding and problem-solving. However, effect sizes vary by implementation fidelity, task complexity, and the presence of assessment rubrics.

Affective and Social Outcomes

Peer teaching can bolster motivation, reduce anxiety, and improve communication skills. Students often perceive peers as more approachable and less judgmental than teachers. Conversely, social loafing, dominance by high achievers, and peer conflict can undermine benefits if roles are unclear or group dynamics are unmanaged.

Implementation Challenges

Key barriers include:

- **Training Gaps:** Both teachers and student tutors need explicit instruction in facilitation and feedback techniques.
- **Time Constraints:** Preparing peer-led sessions requires upfront investment.
- **Assessment Alignment:** Summative exams may not reward collaborative processes.
- **Equity Issues:** High-performing students may be overburdened; lower-performing ones may receive oversimplified explanations.

Gaps in the Literature

Most research either targets primary/middle school or tertiary settings. Senior secondary contexts—influenced by high-stakes exams—are underrepresented. Few studies triangulate quantitative gains with qualitative insights into student experience. There is also a paucity of culturally responsive peer teaching models tailored to hierarchical classroom cultures common in many regions.

METHODOLOGY

Research Design

An explanatory sequential mixed-method design was adopted. Phase I involved a cross-sectional survey with pre- and post-tests. Phase II consisted of FGDs and classroom observations to explain quantitative trends.

Population and Sample

The population comprised senior secondary students (Classes XI–XII) and their subject teachers in private and government-aided schools. Using stratified random sampling, four schools were selected (two urban, two semi-urban). Within these, 8 sections (streams: Science and Commerce) were chosen. The final sample included **320 students** (168 females, 152 males) and **40 teachers**.

Instruments

1. **Academic Achievement Tests:** Researcher-developed unit tests in mathematics, biology, and economics (KR-20 reliability = .81).
2. **Student Engagement Scale:** Adapted from Fredricks et al. (2004), measuring behavioral, emotional, and cognitive engagement ($\alpha = .87$).
3. **Self-Efficacy Scale:** Adapted from Midgley et al. (2000) ($\alpha = .84$).
4. **Collaborative Skills Rubric:** Developed for this study to rate communication, accountability, and conflict resolution during peer sessions.
5. **Perception Questionnaires:** Likert-type items for teachers and students.
6. **Observation Checklist and FGD Guide:** To capture process variables.

Procedure

- **Baseline (Week 1):** Pre-tests and initial surveys administered.
- **Intervention (Weeks 2–6):** Peer teaching implemented twice weekly for 45-minute sessions. Teachers trained students in roles, questioning techniques, and feedback. Models rotated: Weeks 2–3 (Jigsaw), Weeks 4–5 (Reciprocal), Week 6 (Same-age tutoring for revision).
- **Post-Testing (Week 7):** Post-tests and follow-up surveys.
- **Qualitative Phase (Weeks 8–9):** FGDs with purposively sampled students ($n = 32$) and teachers ($n = 8$); two peer teaching sessions observed per subject.

Data Analysis

Quantitative data were analyzed using paired-samples t-tests and ANCOVA to control for baseline differences. Effect sizes (Cohen's d) were calculated. Qualitative data underwent thematic analysis following Braun and Clarke (2006): familiarization, coding, theme development, review, and naming.

Ethical Considerations

Informed consent was obtained from school authorities, teachers, students, and guardians. Participation was voluntary, with confidentiality assured. Data were anonymized, and findings shared with stakeholders.

Survey Research Component

Survey Overview

The survey investigated four constructs: academic self-efficacy, engagement, perceived clarity of concepts, and satisfaction with learning. Sample items included: “Explaining to my peers helps me understand the topic better” and “I feel more confident attempting difficult questions after peer sessions.” A 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) was used.

Descriptive Statistics (n = 320)

- Mean engagement score increased from 3.02 (SD = 0.61) to 3.68 (SD = 0.53).
- Self-efficacy rose from 2.89 (SD = 0.58) to 3.55 (SD = 0.57).
- 78% agreed or strongly agreed that peer teaching clarified difficult concepts.
- 71% reported feeling more comfortable asking questions to peers than teachers.

Inferential Statistics

Paired-samples t-tests indicated significant gains in achievement scores across subjects:

- Mathematics: $t(109) = 5.42, p < .001, d = 0.52$
- Biology: $t(105) = 4.87, p < .001, d = 0.47$
- Economics: $t(104) = 4.34, p < .001, d = 0.43$

ANCOVA controlling for pre-test scores showed that the type of peer teaching model was a significant predictor of post-test performance ($F(3, 312) = 6.18, p < .01$), with jigsaw yielding the highest adjusted means.

Qualitative Themes

1. **Voice and Agency:** Students appreciated “being heard” and “explaining in our own words.”
2. **Cognitive Elaboration:** Teaching others compelled deeper processing.
3. **Peer Pressure vs. Peer Support:** Some felt pressured to perform; others felt more supported.
4. **Teacher as Facilitator:** Success depended on teacher scaffolding and clarity of roles.

RESULTS

Academic Achievement

Across subjects, students exposed to peer teaching outperformed control groups taught solely through lectures. The medium effect sizes suggest practical significance, particularly in conceptual-heavy units.

Engagement and Self-Efficacy

The significant improvements in engagement and self-efficacy indicate that peer teaching not only impacts grades but also students' attitudes toward learning. Behavioral engagement (attendance, participation) rose modestly, while cognitive engagement (strategic thinking, metacognition) showed notable gains.

Perceptions and Process

Teacher surveys revealed that 82% found peer teaching useful for differentiation. However, 45% cited difficulties in monitoring all groups simultaneously. Students' qualitative feedback underscored the need for clear criteria and equitable distribution of speaking opportunities.

Challenges Identified

- Unequal participation and “free riding”
- Limited time to prepare high-quality peer-led materials
- Misconceptions spreading if not promptly corrected
- Alignment with summative assessments focusing on individual performance

CONCLUSION

Peer teaching models, when systematically implemented, are effective in enhancing academic achievement, engagement, and self-efficacy among senior secondary students. The strategy transforms classrooms into communities of practice where learners negotiate meaning, articulate reasoning, and support peers. To maximize benefits:

- Provide structured training to student tutors and clear role descriptions.
- Use rubrics to assess both content mastery and collaborative processes.
- Rotate models (e.g., jigsaw, reciprocal) to maintain novelty and address different learning goals.
- Integrate formative assessment checkpoints to catch misconceptions early.
- Align peer teaching activities with exam requirements to reassure stakeholders.

Future research should explore longitudinal effects, subject-specific adaptations, and digital peer teaching platforms.

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