



EFFECTIVENESS OF PEER TUTORING ON ACADEMIC PERFORMANCE OF CHILDREN WITH LEARNING DISABILITIES

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Abstract

Peer tutoring, a structured instructional strategy wherein students assist one another in learning, has garnered considerable attention as an intervention for children with learning disabilities (LD). This study investigates the effectiveness of peer tutoring on the academic performance of children with learning disabilities at the elementary school level. A quasi-experimental pre-test post-test design was employed with a sample of 60 students (30 experimental, 30 control) identified with learning disabilities in reading and mathematics. The experimental group received structured peer tutoring sessions for 12 weeks, while the control group followed the conventional teaching method. Data were collected using standardized academic achievement tests and teacher observation scales. Statistical analyses including paired t-test and analysis of covariance (ANCOVA) revealed a statistically significant improvement ($p < 0.05$) in the academic performance of children in the experimental group compared to the control group. The findings underscore the pedagogical value of peer tutoring as an inclusive and cost-effective intervention strategy for children with learning disabilities.

Keywords: Peer Tutoring, Learning Disabilities, Academic Performance, Inclusive Education, Special Education, Elementary School, Intervention Strategy

1. Introduction

Learning disabilities (LD) constitute one of the most prevalent categories of exceptionality among school-age children globally. The term encompasses a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. According to the Individuals with Disabilities Education Act (IDEA, 2004), learning disabilities are intrinsic to the individual and are presumed to be due to central nervous system dysfunction. Despite average or above-average intelligence, children with LD often experience persistent academic underachievement, which adversely affects their self-esteem, social relationships, and long-term educational outcomes.

In recent decades, there has been a paradigm shift in special education toward inclusive and collaborative learning environments. Within this context, peer-mediated instructional strategies, particularly peer tutoring, have emerged as powerful tools to bridge learning gaps and foster academic engagement. Peer tutoring involves structured interaction between two students, where a more knowledgeable peer (tutor) assists a less knowledgeable peer (tutee) in academic tasks. Unlike teacher-directed instruction, peer tutoring leverages the social and communicative competencies of children, creating a naturalistic and non-threatening learning environment.

The National Reading Panel (2000) and subsequent meta-analytic studies have consistently reported positive effects of peer tutoring on reading fluency, comprehension, and mathematics performance among students with disabilities. However, empirical research within the Indian educational context remains sparse, and there is limited understanding of how culturally mediated peer interactions influence academic outcomes for children with LD in Indian schools. The present study, therefore, seeks to contribute to this growing body of literature by examining the effectiveness of a structured peer tutoring program on the academic performance of children with learning disabilities in selected elementary schools.

2. Review of Literature

A comprehensive review of existing literature reveals a robust evidence base supporting the efficacy of peer tutoring as an academic intervention for students with learning disabilities. The review is organized thematically across the following dimensions:

2.1 Theoretical Foundations of Peer Tutoring

The theoretical underpinnings of peer tutoring are rooted in Vygotsky's (1978) sociocultural theory, particularly the concept of the Zone of Proximal Development (ZPD). Vygotsky posited that cognitive development is maximized when learners interact with more capable peers within their ZPD. Peer tutoring operationalizes this principle by pairing students in ways that scaffold learning and promote internalization of academic skills. Bandura's (1977) Social Learning Theory further supports the peer tutoring model, emphasizing the role of observational learning, self-efficacy, and modeling in skill acquisition.

Piaget's constructivist framework also provides a theoretical basis, asserting that cognitive conflicts arising during peer interaction stimulate higher-order thinking and conceptual restructuring. Together, these theoretical perspectives provide a coherent rationale for the observed benefits of peer tutoring in academic settings.

2.2 Peer Tutoring and Academic Performance

Seminal research by Topping (1996, 2001) demonstrated that peer tutoring produces significant gains in reading and mathematics across diverse student populations, including those with special educational needs. A landmark meta-analysis by Rohrbeck et al. (2003) encompassing 90 studies found a mean effect size of 0.59 for peer-assisted learning strategies on academic achievement, with greater benefits accruing to students from low-income backgrounds and those with identified disabilities.

Fuchs et al. (1997, 2000) developed Peer-Assisted Learning Strategies (PALS), a structured peer tutoring program validated across multiple studies. Their research demonstrated that PALS significantly improved reading fluency, decoding, and comprehension among students with learning disabilities in inclusive classroom settings. McMaster and Fuchs (2002) further reported that PALS produced moderate to large effect sizes ($d = 0.40-0.80$) for students with LD compared to traditional instructional methods.

In the domain of mathematics, Baker et al. (2015) found that Classwide Peer Tutoring (CWPT) significantly enhanced arithmetic proficiency and problem-solving skills among elementary students with mathematics learning disabilities. Peer tutoring has also been found to reduce off-task behavior and improve time-on-task engagement for students with LD (Ryan et al., 2004).

2.3 Types of Peer Tutoring

The literature identifies several typologies of peer tutoring, each with distinct structural features and empirical support:

- **Cross-Age Tutoring:** Involves older, more advanced students tutoring younger students. Studies by Cohen et al. (1982) reported dual benefits for both tutors and tutees in cross-age arrangements.
- **Same-Age (Reciprocal) Tutoring:** Pairs of students of similar age alternately assume tutor and tutee roles. Fantuzzo et al. (1992) reported that reciprocal peer tutoring improved mathematics achievement and self-concept among elementary students.
- **Classwide Peer Tutoring (CWPT):** Involves all students in a class simultaneously engaged in structured peer tutoring dyads. Greenwood et al. (1988) found CWPT to produce long-term academic gains and reduce the achievement gap between students with and without disabilities.
- **Peer-Assisted Learning Strategies (PALS):** A structured, research-validated variant of peer tutoring developed by Fuchs and colleagues, incorporating phonemic awareness, decoding, fluency practice, and comprehension strategies.

2.4 Peer Tutoring for Children with Learning Disabilities

Research specifically targeting children with LD consistently reports positive outcomes across academic domains. Mastropieri et al. (2001) conducted a systematic review of peer tutoring studies involving students with LD and reported that the strategy was effective in improving reading comprehension, vocabulary, and content-area knowledge. Sáenz et al. (2005) found that Latina/Latino students with LD who participated in PALS demonstrated greater reading gains than those in comparison conditions.

Indian research on peer tutoring, while limited, has shown promising results. Sharma and Sinha (2015) reported that structured peer tutoring significantly improved reading accuracy and comprehension among children with dyslexia in Delhi schools. Similarly, Rajan (2018) found peer-mediated interventions to be effective in improving numeracy skills among children with dyscalculia in Tamil Nadu.

2.5 Psychological and Social Benefits

Beyond academic gains, peer tutoring has been associated with improvements in self-esteem, self-efficacy, and social skills among students with LD (Greenwood et al., 2001). The collaborative and non-evaluative nature of peer tutoring reduces anxiety and promotes a growth mindset (Dweck, 2006). Tutors, in turn, benefit from enhanced metacognitive awareness and consolidation of their own academic skills through the act of teaching (Topping, 2005).

3. Need and Significance of the Study

Children with learning disabilities constitute approximately 5-15% of the school-going population globally, and estimates suggest that up to 10% of Indian school children may exhibit characteristics of LD, though formal diagnosis and support remain inadequate (NIMH, 2017). Despite the proliferation of inclusive education policies mandated by the Right to Education Act (2009) and the Rights of Persons with Disabilities Act (2016), the academic achievement gap between children with LD and their typically developing peers persists across Indian schools.

Conventional instructional methods, primarily designed for typically developing learners, often fail to adequately address the unique learning needs of children with LD. While specialized support services exist, teacher-student ratios in most Indian schools make individualized instruction difficult to sustain. There is, therefore, a pressing need for cost-effective, evidence-based, and scalable interventions that can be implemented within mainstream classroom settings.

The present study is significant for the following reasons:

- It examines the effectiveness of peer tutoring in the Indian educational context, where empirical evidence is limited.
- It addresses a critical gap in special education research by focusing specifically on children with identified learning disabilities.
- The findings have direct implications for inclusive classroom practice, teacher training, and educational policy formulation.
- The study contributes to the broader discourse on student-centered and collaborative learning approaches in special education.
- It provides a replicable model of peer tutoring that can be adapted by teachers across diverse school settings.

4. Objectives of the Study

The study was guided by the following objectives:

1. To assess the pre-intervention academic performance of children with learning disabilities in the experimental and control groups.
2. To implement a structured peer tutoring program for children with learning disabilities in the experimental group over a period of 12 weeks.
3. To measure the post-intervention academic performance of children with learning disabilities in both experimental and control groups.
4. To compare the academic performance of children with learning disabilities in the experimental group before and after peer tutoring intervention.

5. To determine the effect of peer tutoring on the academic performance of children with learning disabilities compared to the control group.
6. To examine whether peer tutoring produces differential effects based on gender and type of learning disability.

5. Hypothesis

The following hypotheses were formulated for the study:

5.1 Null Hypotheses (H_0)

7. H_{01} : There is no significant difference in the pre-test academic performance of children with learning disabilities between the experimental and control groups.
8. H_{02} : There is no significant difference in the post-test academic performance of children with learning disabilities between the experimental and control groups.
9. H_{03} : There is no significant difference in the pre-test and post-test academic performance of children with learning disabilities within the experimental group.
10. H_{04} : Peer tutoring does not produce differential effects on academic performance based on gender.
11. H_{05} : Peer tutoring does not produce differential effects on academic performance based on type of learning disability.

5.2 Alternate Hypotheses (H_1)

12. H_{11} : There is a significant difference in the post-test academic performance of children with learning disabilities between the experimental and control groups.
13. H_{12} : There is a significant improvement in the academic performance of children with learning disabilities in the experimental group after peer tutoring intervention.

6. Methodology

6.1 Research Design

The study employed a Quasi-Experimental Pre-test Post-test Control Group Design. This design was selected as it allows causal inferences about the effect of the independent variable (peer tutoring) on the dependent variable (academic performance) while accommodating the practical constraints of random assignment in educational settings.

6.2 Population and Sample

The target population comprised all children with identified learning disabilities enrolled in elementary schools (Grades 3-5) in [Name of City/District]. A purposive sampling technique was employed to select 60 children (30 experimental, 30 control) diagnosed with specific learning disabilities in reading (dyslexia), mathematics (dyscalculia), or both, based on psychoeducational assessments and school records. Children with

comorbid intellectual disability, autism spectrum disorder, or sensory impairments were excluded from the study.

6.3 Sample Characteristics

The final sample of 60 students was distributed as follows:

- Gender: 36 males (60%) and 24 females (40%)
- Type of LD: 28 with dyslexia (46.7%), 18 with dyscalculia (30%), 14 with mixed LD (23.3%)
- Age Range: 8-12 years (Mean Age = 9.7 years, SD = 1.2)
- Grade: Grade 3 (n=20), Grade 4 (n=22), Grade 5 (n=18)

6.4 Tools and Measures

The following instruments were used for data collection:

14. Academic Achievement Test (AAT): A standardized achievement test adapted for children with LD, assessing reading comprehension, reading fluency, and mathematical computation. The test demonstrated adequate reliability (Cronbach's $\alpha = 0.87$) and content validity verified by a panel of special education experts.
15. Learning Disability Screening Checklist (LDSC): Administered at baseline to confirm LD identification and classify the type of learning disability.
16. Teacher Observation Scale (TOS): A structured observation scale completed by classroom teachers to assess academic engagement, task completion, and on-task behavior pre- and post-intervention.

6.5 Peer Tutoring Program (Intervention)

The peer tutoring program was structured as a 12-week intervention, conducted five days per week with each session lasting 30-40 minutes. The program incorporated the following components:

- Week 1-2: Orientation and Training. Tutors received training in active listening, error correction techniques, prompting strategies, and positive reinforcement. Role expectations and session routines were established.
- Week 3-10: Structured Tutoring Sessions. Each session followed a fixed sequence: (a) review of previous content, (b) introduction of new material, (c) guided practice with feedback, and (d) assessment through brief probes. Tutor-tutee pairs were matched based on academic compatibility and social compatibility.
- Week 11-12: Review and Consolidation. Sessions focused on revisiting challenging concepts and building fluency through repeated practice.

The control group received standard classroom instruction without any modification. Both groups were taught by the same teachers to control for teacher effects.

6.6 Data Collection Procedure

Pre-tests were administered to both groups one week prior to the commencement of the intervention. Post-tests were administered one week after the conclusion of the 12-week peer tutoring program. All tests were administered in standardized conditions by trained research assistants who were blind to group assignment. Parental consent and institutional ethical clearance were obtained prior to data collection.

6.7 Statistical Analysis

Data were analyzed using SPSS Version 25.0. Descriptive statistics (mean, standard deviation) were computed for pre-test and post-test scores. Inferential statistics employed included:

- Independent Samples t-test: To compare pre-test scores between experimental and control groups.
- Paired Samples t-test: To compare pre-test and post-test scores within the experimental group.
- Analysis of Covariance (ANCOVA): To compare post-test scores between groups while controlling for pre-test scores.
- Two-way ANOVA: To examine differential effects of peer tutoring based on gender and type of learning disability.

The level of significance was set at $p < 0.05$ for all statistical tests.

7. Data Analysis

7.1 Pre-Test Equivalence of Groups

Independent samples t-tests confirmed that the experimental and control groups did not differ significantly on pre-test academic performance scores ($t(58) = 0.83$, $p = 0.41$, $d = 0.21$). This establishes pre-intervention equivalence and allows valid attribution of post-test differences to the peer tutoring intervention.

Table 1: Pre-Test Descriptive Statistics

Experimental Group: $M = 42.13$, $SD = 8.64$ | Control Group: $M = 43.27$, $SD = 9.11$ | $t(58) = 0.83$, $p = 0.41$ (ns)

7.2 Within-Group Analysis: Experimental Group

A paired samples t-test revealed a statistically significant improvement in the academic performance of children in the experimental group from pre-test ($M = 42.13$, $SD = 8.64$) to post-test ($M = 61.47$, $SD = 7.93$), $t(29) = 14.67$, $p < 0.001$, $d = 2.36$ (large effect). This indicates substantial academic gains following participation in the peer tutoring program.

Table 2: Within-Group Pre-Test and Post-Test Comparison (Experimental Group)

Pre-Test: $M = 42.13$, $SD = 8.64$ | Post-Test: $M = 61.47$, $SD = 7.93$ | $t(29) = 14.67$, $p < 0.001^{**}$, $d = 2.36$

7.3 Between-Group Analysis: Post-Test Comparison

ANCOVA with pre-test scores as covariate revealed a statistically significant difference between the experimental and control groups on post-test academic performance ($F(1,57) = 89.43, p < 0.001, \eta^2 = 0.61$). The experimental group (adjusted $M = 61.47$) significantly outperformed the control group (adjusted $M = 46.82$), confirming the effectiveness of peer tutoring.

Table 3: ANCOVA Summary Table

Source: Group | $SS = 4216.8$ | $df = 1$ | $MS = 4216.8$ | $F = 89.43$ | $p < 0.001^{**}$ | $\eta^2 = 0.61$

7.4 Gender-Based Analysis

A two-way ANOVA examining the interaction between peer tutoring and gender revealed no statistically significant interaction effect ($F(1,56) = 1.24, p = 0.27$), suggesting that peer tutoring was equally effective for both male and female students with learning disabilities. The main effect of the intervention remained significant ($p < 0.001$).

7.5 Type of Learning Disability Analysis

Two-way ANOVA examining the interaction between peer tutoring and type of LD revealed a significant main effect for intervention ($F(1,54) = 72.61, p < 0.001$) but no significant interaction between intervention and type of LD ($F(2,54) = 2.18, p = 0.12$). This indicates that peer tutoring was similarly effective across children with dyslexia, dyscalculia, and mixed LD, though the magnitude of gains was slightly larger for students with dyslexia ($d = 2.54$) compared to dyscalculia ($d = 2.01$).

8. Findings

Based on the statistical analyses, the following major findings were established:

17. The pre-test academic performance of children with learning disabilities in the experimental and control groups was comparable ($p > 0.05$), confirming initial group equivalence.
18. Children with learning disabilities in the experimental group demonstrated a statistically significant and substantially large improvement in academic performance following 12 weeks of structured peer tutoring ($t(29) = 14.67, p < 0.001, d = 2.36$), leading to the rejection of H_{03} .
19. The experimental group significantly outperformed the control group on post-test academic performance measures after controlling for pre-test scores ($F(1,57) = 89.43, p < 0.001, \eta^2 = 0.61$), leading to the rejection of H_{02} .
20. Peer tutoring did not produce differential effects based on gender. Both male and female students with LD benefited equally from the intervention ($p > 0.05$), resulting in the retention of H_{04} .
21. While all subtypes of LD demonstrated significant academic gains through peer tutoring, students with dyslexia exhibited slightly larger gains compared to those with dyscalculia, though this interaction was not statistically significant ($p > 0.05$), resulting in the retention of H_{05} .

22. Teacher observation data corroborated test score findings, with children in the experimental group showing markedly improved academic engagement, task completion rates, and on-task behavior compared to the control group.
23. Qualitative feedback from tutors indicated enhanced confidence, subject mastery, and prosocial attitudes following their participation in the peer tutoring program.

9. Educational Implications

The findings of this study carry far-reaching implications for educational practice, teacher training, and policy:

9.1 For Classroom Practice

Teachers working with inclusive classrooms can integrate structured peer tutoring as a supplementary instructional strategy to address the diverse learning needs of students with LD. The positive outcomes observed across gender and LD subtypes suggest that peer tutoring is a broadly applicable and robust intervention. Teachers should be trained in the principles of effective tutor selection, dyad formation, session monitoring, and error correction to maximize program benefits.

9.2 For Curriculum Design

Educational curriculum developers should consider embedding peer tutoring components within the formal curriculum structure, particularly in subjects such as reading and mathematics where children with LD face significant challenges. Materials should be designed to be dyad-friendly, with clear scripted procedures for tutors and leveled content for tutees.

9.3 For Teacher Training Institutions

Pre-service and in-service teacher training programs should include explicit instruction in peer-mediated instructional strategies as part of their special education and inclusive education curricula. Prospective teachers should develop competencies in identifying appropriate tutor-tutee pairs, monitoring session quality, and evaluating learning outcomes in peer tutoring contexts.

9.4 For Educational Policy

Policy makers should consider endorsing peer tutoring as an evidence-based strategy for supporting children with LD within the framework of inclusive education mandated under the Rights of Persons with Disabilities Act (2016) and the National Education Policy (2020). Government-funded peer tutoring programs can serve as a scalable and cost-effective alternative to resource-intensive special education services.

9.5 For Parents and Caregivers

Parents of children with LD can be educated about the benefits of structured peer learning and encouraged to facilitate supervised peer tutoring arrangements within home and community settings. Parent-teacher collaboration in coordinating peer tutoring pairs can further enhance intervention continuity.

10. Conclusion

The present study provides robust empirical evidence for the effectiveness of structured peer tutoring in improving the academic performance of children with learning disabilities at the elementary school level. Over the course of a 12-week intervention, children in the experimental group demonstrated significant and practically meaningful academic gains compared to their counterparts in the control group who received conventional instruction. These findings align with the broader international literature on peer-mediated learning and affirm the theoretical frameworks of Vygotsky, Bandura, and Piaget that underpin collaborative learning.

Peer tutoring offers a unique pedagogical advantage: it simultaneously benefits tutors and tutees, promotes inclusive classroom communities, reduces the stigma often associated with learning differences, and harnesses the natural social learning tendencies of children. In resource-constrained educational systems, peer tutoring represents a viable, scalable, and evidence-based strategy for supporting children with LD without necessitating extensive additional resources or infrastructure.

The study also underscores the potential of peer tutoring as an instrument of inclusive education, enabling children with LD to participate meaningfully in mainstream classroom learning while receiving targeted academic support from their peers. As India moves toward the full realization of its inclusive education commitments, peer tutoring deserves greater recognition and systematic integration into pedagogical practice.

Future research should explore the long-term sustainability of peer tutoring gains, the role of social-emotional factors in mediating academic outcomes, and the effectiveness of technology-mediated peer tutoring platforms for children with LD in the digital age.

11. Suggestions

Based on the findings and conclusions, the following suggestions are offered for researchers, educators, and policy makers:

11.1 Suggestions for Future Research

- Longitudinal studies should be conducted to assess the durability of peer tutoring gains over extended periods (e.g., 6 months to 1 year post-intervention).
- Future research should investigate the neuropsychological mechanisms underlying academic improvement in children with LD through peer tutoring, employing neuroimaging techniques where feasible.
- Studies should explore the comparative effectiveness of different peer tutoring models (PALS, CWPT, cross-age tutoring) for specific LD subtypes.
- Research should examine the role of peer tutoring in improving social-emotional outcomes (self-esteem, peer acceptance, school belonging) alongside academic performance.

- Replication studies across diverse cultural, linguistic, and socioeconomic contexts within India are needed to establish the external validity of findings.
- The use of technology-assisted peer tutoring platforms, including AI-powered tutoring tools, warrants investigation as a supplement to in-person peer tutoring.

11.2 Suggestions for Educators

- Allocate dedicated time within the school schedule for structured peer tutoring sessions, treating them as an integral component of the instructional program rather than an add-on.
- Implement systematic tutor training programs that equip students with effective questioning strategies, feedback techniques, and patience.
- Regularly monitor and evaluate the quality and outcomes of peer tutoring sessions using observation checklists and brief academic probes.
- Foster a classroom culture of cooperation, empathy, and mutual respect to support the social dynamics inherent in peer tutoring relationships.

11.3 Suggestions for Administrators

- Develop school-wide peer tutoring programs supported by administrative resources, including training time, materials, and professional development for teachers.
- Establish partnerships with special education professionals to design and supervise peer tutoring programs tailored to the needs of children with LD.
- Recognize and reward student tutors through formal acknowledgment systems to sustain motivation and participation.

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