

## Peer-Mediated Instruction and Intervention

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### Introduction

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Teachers in general and special education classrooms are continually faced with instructional challenges as the diversity of students in classrooms widens. Researchers and practitioners are interested in implementing best practices that improve educational outcomes for all learners. One solution to overcoming these challenges is the implementation of Peer-Mediated Instruction and Intervention (PMII). Peer-mediated instruction is a widely applied and researched educational intervention in both general and special education settings. Peer-mediated instructional situations are flexible and may utilize many configurations. Several variations of empirically validated PMII implementations are summarized below. Numerous positive effects have been found in research conducted on varying forms of peer-mediated instruction. Four characteristics are common across all forms of PMII, these include: (a) assignment and training of students to roles in the PMII configuration, (b) students instruct one another, (c) teachers monitor and facilitate all PMII groups in the classroom, and (d) structures are designed to increase academic as well as social goals for all students.

### Definition

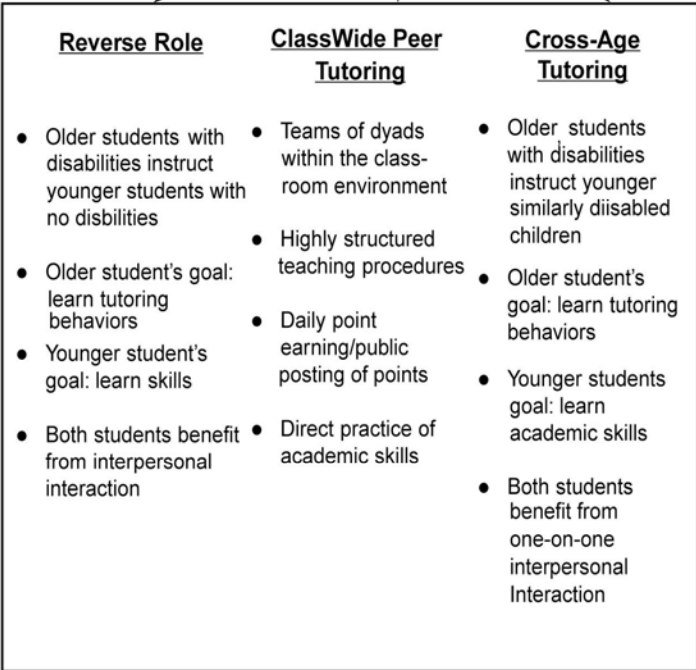
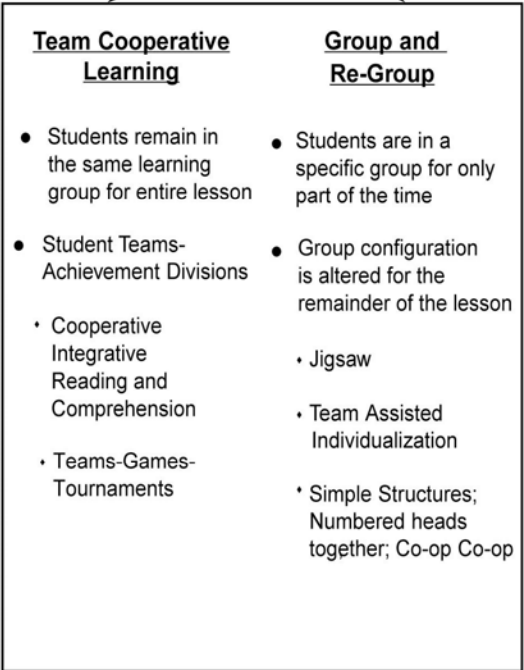
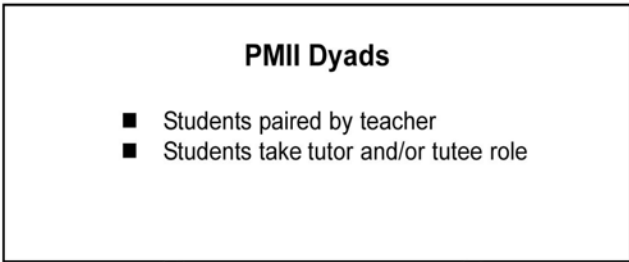
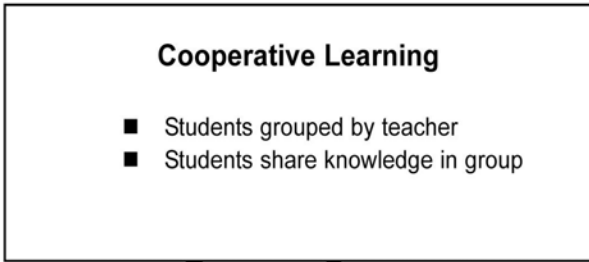
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Peer-Mediated Instruction and Intervention is an alternative classroom arrangement in which students take an instructional role with classmates or other students. Many approaches have been developed in which students work in pairs (dyads) or small cooperative learning groups. To be most effective, students must be taught roles in the instructional episode; to be systematic, elicit responses, and provide feedback. Research supports the use of these approaches as alternative practice activities, however, does not condone the use of peers for providing instruction in “new” instructional content.

### Identifying Components/Features

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Peer-Mediated Instruction and Intervention (PMII) provides alternatives to traditional classroom arrangements of lecture, demonstrations, independent study, etc. Students are taught roles by their teacher and, through these roles, systematically instruct other students. During this process, the teacher monitors and facilitates pupils' progress. The most frequently cited and researched goals of PMII are to build academic and social skills (e.g., Fuchs, Fuchs, Thompson, Svenson, Yen, Otaiba, Yang, McMaster, Prentice, Kazdan & Saenz, 2001; Greenwood, Arreaga-Mayer, Utley, Gavin, & Terry, 2001; Johnson, & Johnson, 1986; Locke, & Fuchs, 1995; Madden, & Slavin, 1983).



## Cooperative Learning

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In Cooperative Learning, the teacher systematically organizes groups of three to six students to work and learn together. The students are often assigned roles in their group for completing the task. Students depend on each other to learn academic material while developing stronger social skills. Since the students work in a team to accomplish the academic goal, it produces a cooperative environment that can have a positive outcome for children of all abilities. Cooperative reward structures are used as incentive to encourage the pupils to learn the material (McMaster, & Fuchs, 2002; Tateyama-Sniezek, 1990). In other respects, specific Cooperative Learning activities (writing reports, worksheets, or preparing a presentation) differ greatly from each other.

The main difference between types of Cooperative Learning is dependant upon whether the structure of the group remains intact during the PMII sessions. Groups that remain intact for the entire session time are referred to as *Team Cooperative Learning*. For our purposes, groups that do *not* remain intact will be called *Group and Regroup*.

### **Team Cooperative Learning**

A characteristic of Team Cooperative Learning is structural continuity during the learning session. Students are assigned team membership and work in those teams for the entire lesson.

- *Student Teams-Achievement Divisions (STAD)* was developed by researchers at Johns Hopkins University (Slavin, 1990 as cited in Maheady et al., 1991). After the teacher teaches a lesson, the students work in teams to make sure that everyone has mastered the new material. All students take quizzes, and the scores are compared to their previous test scores. If students meet or exceed their previous averages with their quiz scores, they get points that are summed according to team membership. Teams are rewarded based on predetermined criteria (Maheady et al., 1991).
- *Cooperative Integrated Reading and Comprehension (CIRC)* is a comprehensive program for teaching reading and writing in upper elementary grades. Teachers provide instruction to groups using the classroom curriculum. While the teacher works with one reading group, students in the other groups work in pairs with teammates on other reading and composition-related activities. CIRC follows the cycle of the teacher presenting, team practice, individual practice, peer assessment, and individual testing. Stevens, Madden, Slavin, & Farnish, 1987).
- *Teams Games Tournaments (TGT)* was developed by DeVries and Slavin (1978). It follows almost the same practice format as STAD, but instead of taking weekly quizzes, students participate in weekly tournaments. After weekly team practice, students are assigned to three-person tournament tables where they compete against peers of comparable ability. Students earn points for their teams during these tournaments. Student's points at different tables are worth the same amount, so regardless of ability, low and high achievers have equal opportunity for point-earning success (DeVries & Slavin, 1978).

### **Group and Regroup**

This style of PMII is characterized by its structural change during the learning session. In all of these alternative teaching techniques, the students are assigned to a small group of students that they work with for part of the lesson. During the remainder of the time, the teacher lectures or they work in different groups. Therefore, during a learning session, the organization of the learning environment changes.

- *Jigsaw* was developed by Aronson and his colleagues in 1978 (as cited in Maheady et al., 1991), students are placed into three- to six-member heterogeneous learning groups. Each member of the group becomes an “expert” on a section of the lesson. The students are told to read their sections, and then meet in “expert groups” with other group members that read the same section. They discuss the material, identify the most important learning points, and return to their original groups to instruct team members about information in which they become “expert”. Group members are responsible to learn all content from one another.
- *Team Assisted Individualization (TAI)* is a combination of cooperative learning and individualized instruction. Students are placed in an individual sequence of the learning material based on test performance. They proceed at their own pace, but their team checks daily practice sheets. Students earn points for their respective teams by passing final tests, completing multiple units, and handing in assignments. Students take their final unit tests individually (Slavin, Leavey, Madden, 1986 as cited in Maheady, Harper & Malette, 1991).
- *Simple Structures*: Kagan (1992) developed over 14 cooperative classroom structures, as opposed to traditional competitive structures. He has argued that competitive classroom structures set students against one another, whereas cooperative structures organize more positive social interactions among students. Some examples are:
  - ♦ *Numbered Heads Together (NHT)*: The teacher breaks the students into heterogeneous groups of one high achieving, two average, and one low-achieving student, and gives the students numbers 1-4. Then, the teacher lectures in the traditional format, and asks questions. The students turn to their group, and discuss the question so that every group member knows the answer. The teacher calls out a number, and only the team members with that number can raise their hand to answer the question. The goal of *NHT* is for all students to learn by working together, cooperatively. In addition, the social structure of the groups fosters heterogeneous friendships (Kagan, 1992).
  - ♦ *Co-op Co-op*: This structure has two levels to it: team learning and mini-topic learning. The order of tasks the students complete include: (1) Student-centered class discussion, (2) selection of heterogeneous student teams, (3) team building and skill development, (4) team topic selection, (5) mini-topic selection (experts), (6) mini-topic preparation, (7) mini-topic presentation, (8) preparation of team presentations, (9) team presentations, (10) reflection and evaluation. *Co-op Co-op* assumes that children are curious and want to learn, thus, it allows the children to be creative and teach others what they discover. Presently, there is little research to substantiate Kagan’s *Simple Structures*, but it is believed that the structure could produce substantial benefits (1998).

## PMII Dyads

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This is a form of peer mediation in which the teachers organize the students in pairs. The students play the role of the tutor and/or the tutee, depending upon which type of PMII Dyads is being used. There are three methods of institutionalizing PMII Dyads: Reverse-Role Tutoring, Class-Wide Peer Tutoring, and Cross-Age Tutoring.

- **Reverse-Role Tutoring** is a form of PMII in which students with disabilities tutor a student who is younger and not disabled. The students' teachers and parents often organize Reverse-Role Tutoring outside of the general classroom environment. The role of tutor for the older student includes: (a) tutoring and interpersonal skills, and (b) provision of often needed practice in an academic area. The younger student, who is not disabled, is provided with the opportunity to practice and obtain mastery with the academic material. Data from research in this area has demonstrated that both students can benefit interpersonally from the one-on-one interaction in a tutoring situation (Top, & Osguthorpe, 1987).
- **Class-Wide Peer Tutoring (CWPT)** uses the structure of dyads created by the teacher. The unique feature is that all peer-tutoring groups are orchestrated within the classroom. The students are specifically instructed on how to tutor one another, so that each tutee has the benefit of one-on-one instruction and feedback for half of the time period. After the tutee completes the assigned tasks and earns points for their progress, the students switch roles. The point earnings of the dyads are posted in the classroom. Since the students are rewarded as a pair, the tutor is as invested in the exercise as the tutee. Some researchers that have been working on CWPT are: Johnson & Johnson, (2000) and Maheady, Harper, Sacca, & Greenwood (1998).
- **Cross-Age Tutoring** is commonly used outside of the general classroom environment. Teachers and parents typically set up Cross-Age Tutoring. Older students with disabilities instruct younger children with similar disabilities. As in Reverse-Role Tutoring, the tutor role teaches the older student tutoring skills and the tutee role teaches the younger student academic material. The younger and older students benefit socially from the tutoring environment and learn the academic content (Maher, 1984).

## Applications to General Education Classroom Settings

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Varying forms of Peer Mediated Instruction and Interventions have been conducted in a great range of settings over the decades. Research has been conducted in educational and non-educational environments with positive outcomes in each. While the focus of this paper has included varying forms of application, the major focus has been the educational setting. It is important to note that PMII strategies are not restricted or inclusive to education or special education, but have been found to be effective in each—as well as inclusive classroom settings. The following characteristics have been identified by Kulik & Kulik (1992), as central for successful implementation of Peer Mediated Instruction.

- **Expectations for student learning.** Teachers should establish high expectation levels. No students are expected to fall below the level of learning needed to be successful at the next level of education.

- *Careful orientation to lessons.* Teachers must clearly describe the relationship of a current lesson to previous study. Students are reminded of key concepts or skills previously covered.
- *Clear and focused instructions to participants.*
- *Close teacher monitoring of student progress.* Frequently formal and informal monitoring of student learning by teachers. Teachers must require that students are accountable for their product and learning.
- *Re-teach.* If students show signs of confusion, misinterpretation or misunderstanding, the teacher must be responsible to teach again.
- *Use class time for learning.* Students must pace themselves and should be monitored for task completion.
- *Positive and personal teacher and student interaction.* Cooperative Learning and Peer Tutoring Strategies are instruction methods of choice in many classrooms as they are noted for preventing and alleviating many social problems related to children, adolescents, and young adults.

## Evidence of Effectiveness

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There is an extensive research literature in the areas of peer mediation and tutoring. In a meta-analysis on PMII, Johnson, Johnson & Stanne (2000) report that over 900 studies on social interdependence were found. Of those, 164 studies evaluated the impact of a PMII procedure on student achievement. Most of these studies were conducted since 1970. However, research is noted to have occurred over the last century.

In total, 194 comparisons of PMII and control methods were identified since some studies compared multiple methods. The widespread base of use is due to three factors, (a) clear theoretical base, (b) solid research-based validation, and (c) clear procedural applications that have made operationalizing the varying types of PMII reasonable for educators. Forms of Peer Mediated Instruction and Intervention are reported to be the instructional method of choice for preventing and alleviating many of the social problems related to children, adolescents, and young adults (Johnson, Johnson, & Stanne, 2000).

The research in PMII is not only extensive but broad-ranged. The characteristics of these studies are large. In relation to age, studies have been conducted at all formal education levels and beyond, including elementary to post secondary (higher education and adult settings). Research has also been conducted across groups, minority, gender and countries. In addition to North America, Johnson et al. cite studies conducted in Southeast Asia, Africa, the Middle East and Europe. Finally, PMII research includes studies focusing on a range of ability—students with mild disabilities, participants with physical and cognitive disabilities, English language learners, and non-disabled learners.

Effectiveness of PMII on the whole has been positive. Researchers have focused on varying outcomes over a range of studies and years. These include achievement, higher-level reasoning, retention, on-task behavior, generalization and transfer of skills knowledge, social and cognitive development, interpersonal interaction, social support, self-esteem, social competencies, internalization of values, and many other outcomes.

**Affects on Tutors and Tutees**

In 1982, Cohen, Kulik, and Kulik conducted a meta-analysis in which they report on peer and cross-age tutoring research prior to the past decade. Their results showed a moderately beneficial effect on tutees achievement, and a smaller but significant effect on their attitudes toward subject matter. Looking at the effects on tutors, these researchers found a small but significant effect for academic outcomes and for self-concept, and a slightly larger effect for attitudes toward subject matter. Tutees' achievement improved more in more structured programs of shorter duration, and when lower-level skills were taught and tested on locally developed examinations.

Elbaum, B., Moody, S. W., Vaughn, S., Schumm, J. S., & Hughes, M. (2001) reported clear benefits to tutoring when the students with disabilities acted as reciprocal tutors/tutees and, in cases when they were only tutees, in relation to achievement outcomes. Additionally, these researchers reported the benefit of increased student self-esteem when in the teacher role. With regard to cross-aged tutoring, the effects were very high for the tutors, less so for cross-age tutees. Finally, they found that outcomes for students with disabilities varied depending on the particular focus of instruction. Clearly, more research is called for with regard to this question.

**Achievement Outcomes**

In mathematics, benefits for both tutors and tutees have been shown at the elementary level in skill areas including ratio, proportion, and perspective taking, among others. Significant beneficial effects for students have been noted consistently in an extensive series of studies in language arts. In tutoring structures, significant positive outcomes were noted for tutees and tutors. Areas of Language arts investigated include comprehension strategies, phonemic skills, vocabulary acquisition, story grammar, general decoding skills, fluency practice, and sight word identification (Barbetta et al., 1991; Giesece, et al, 1993; Palincsar & Brown, 1984; Wheldall & Colmar, 1990; and Wheldall & Mettem, 1985). Positive achievement outcomes were noted in research studies conducted in other academic areas such as science, health, art, and social studies (Anliker et al., 1993; Maheady, Sacca, & Harper, 1988; Rosenthal, 1994; and Thurston, 1994). Studies in PMII with applications to physical education have also been conducted with positive outcomes (Block, Oberweiser, & Bain, M., 1995).

**Ranking of Cooperative Learning Methods**

Johnson et al (2000) included a ranking of the most frequently researched cooperative learning methods based on effect sizes. The largest effects were found for Learning Together followed by Constructive Controversy, Teams/Games/Tournaments, and Group Investigation methods. Each of the methods were found to have significantly higher achievement outcomes than did other comparison learning structures. Additionally, the methods were evaluated on five dimensions: (a) ease of learning the method, (b) ease of initial class use, (c) ease of long-term use, (d) applicability to a range of subjects and grades, and (e) ease of adapting the method to conditions. In each ranking the method of Learning Together ranked the highest, the other seven conditions include Teams/Games/Tournaments, Academic Controversy, Jigsaw, Team Assisted Individualization, Cooperative Integrated Reading and Composition, Group Investigation, and Student Teams-Achievement Divisions.

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## Links to Learn More About Peer Mediated Instruction and Intervention

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### Cooperative Learning Strategies

[www.scps.k12.fl.us/staff\\_development/index.cfm?fuseaction=coursestrat](http://www.scps.k12.fl.us/staff_development/index.cfm?fuseaction=coursestrat)

This Web site contains information about cooperative learning strategies such as: Jigsaw, Number Heads Review, think/write and pair/share, semantic web, advanced organizers, pair problem solving, and more. There are a total of 14 different strategies to use in the classroom.

### The Cooperative Learning Network

<http://home.att.net/~clnetwork>

This Web site contains teaching resources from the classroom of Laura Candler. This site includes links and information about music, team management ideas, and cooperative learning worksheets that can be viewed from The File Cabinet and printed. Candler's site also links to the Web site of Dr. Spencer Kagan.

### Cooperative Learning

<http://www.sci.sdsu.edu/BFS/first/coop.html>

The NSF funded FIRST project helps faculty develop skills to include more active, field-centered learning in their curricula. This site provides a series of links to sites with definitions, articles, ideas about Cooperative Learning strategies. The site houses information to other agencies, businesses, universities and schools with examples, articles and ideas about cooperative learning strategies

### Grouping Practices for Effective Student Achievement

<http://ericec.org/osep/newsbriefs/news7.html>

The focus of this News Brief is to describe the evidence of effectiveness for instructional grouping formats, especially dyads. Through the ERIC Clearinghouse on Disabilities and Gifted Education (ERIC EC), CEC operates the ERIC/OSEP Special Project. The ERIC/OSEP Special Project tracks and disseminates federally funded special education research for practitioners through various publications and conferences.

### J.F.K. Center for Research on Human Development—Vanderbilt University

<http://www.vanderbilt.edu/kennedy/topics/peers.html>

Researchers Douglas Fuchs and Lynn S. Fuchs, along with the public school systems in Tennessee, have developed the Peer-assisted Learning Strategies (PALS), a version of class-wide peer tutoring. This site provides a description of development, implementation and research of the PALS program. Additionally, teacher and student comments and notes from the field are included.



**Jigsaw Lesson**

[www.public.asu.edu/~ledlow/sledlow/jigsaw.htm](http://www.public.asu.edu/~ledlow/sledlow/jigsaw.htm)

Susan Ledlow the Director, Instructional Innovation Network, Center for Learning and Teaching Excellence at University of Arizona created this Web site. Ledlow provides ideas and information about Jigsaw procedures. She has developed some guidelines and direction about the Jigsaw “cooperative learning” procedure: <http://bestpractice.net>

**Jigsaw Classroom**

<http://www.jigsaw.org/>

This Web site is designed to share some of the results from Professor Elliott Aronson’s research on cooperative learning techniques. This site includes a history of the Jigsaw Cooperative Learning technique.

**Office of Research, Education Consumer Guides: Cooperative Learning**

<http://www.ed.gov/pubs/OR/ConsumerGuides/cooplear.html>

This Web site provides a summary of information on different types of cooperative learning. The authors describe Cooperative Learning in general and provide the reader with information on specific structures of Cooperative Learning, and a short summary of results in research conducted on Cooperative Learning projects in schools.

**Peer Tutoring and Cross-Age Tutoring (2001)**

<http://www.nwrel.org/scpd/sirs/9/c018.html>

The School Improvement Research Series from the Northwest Regional Educational Laboratory provides a series of papers based on education research. The aim of these papers is to assist with the research-to-practice “gap”. This paper focuses on Peer and Cross-Age Tutoring structures. The authors provide definitions for each, a comparison of these classroom techniques, as well as the purpose and function in classrooms with evidence from some of the research conducted in peer tutoring. Additionally, the authors identify frequent barriers and procedures to overcome these typical, yet remediable problems. The benefits for both tutors and tutees are clearly described.

**Prentice Hall School/Professional Development**

[www.phschool.com/professional\\_development/assessment/rub\\_coop\\_process.cfm](http://www.phschool.com/professional_development/assessment/rub_coop_process.cfm)

Pearson Education, Inc., publishing as Prentice Hall author this site. Included are a Cooperative Learning Project Rubric and a Cooperative Learning Project Evaluation Form. The categories covered in these forms are Group Participation, Shared Responsibility, Quality of Interaction, and Roles Within The Group. The rubric describes four performance areas; Exceptional, Admirable, Acceptable, and Amateur. Included in this Web site are links to The Cooperative Learning Center at the University of Minnesota, and to the Pearson Education, Inc. site.

## References

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- Anliker, J.A., Drake, L.T., & Pacholski, J. (1993). Impacts of a multi-layered nutrition program: Teenagers teaching children. *Journal of Nutrition Education, 25*, 140-3.

The focus of this research included nutrition content in a peer tutoring structure in which teenagers were trained to teach younger students. Pre- and post-assessments of nutrition knowledge were conducted on the tutors. Results indicate that these teenagers as tutors made substantial gains in their own nutrition knowledge. However, tutor knowledge gains did not necessarily lead to changes in eating habits. Although attempts were made to collect data from the tutees in pre-and post-assessments, this proved difficult to do and therefore such material was not attained. More research is necessary to examine the impact of this nutrition education program on the teenagers' eating habits, to assess any changes in their self-esteem, and to evaluate the effects of the program on the nutritional knowledge and practices of the younger children.

- Barbetta, P.M., Miller, A.D., & Peters, M.T. (1991). Tugmate: A cross-age tutoring program to teach sight vocabulary. *Education and Treatment of Children, 14*, 19-37.

The purpose of this study was to evaluate the effectiveness of Tugmate, a cross-age tutoring program, on the acquisition, generalization, and maintenance of sight vocabulary. Tutor performance and teacher and student perceptions of the cross-age tutoring program were also evaluated. Behaviors measured included (a) number of sight vocabulary words mastered; (b) daily tutee performance during pretesting, tutoring, and maintenance; (c) words read in sentences during all conditions; (d) tutor performance; and (e) tutor, tutee, and staff perceptions of the program. All students acquired and maintained a substantial number of new sight vocabulary words after tutoring and mastery were accomplished in only a few sessions. The results of this study also indicate that training high school students can be successful without requiring too much trainer or tutor time.

- Block, M.E., Oberweiser, B., & Bain, M. (1995). Using classwide peer tutoring to facilitate inclusion s with disabilities in regular physical education. *Physical Educator, 52*, 1, 47-56.

The authors report on classwide peer tutoring (CWPT), a form of peer-mediated instruction, as one teaching style that can solve the problem of heterogenous grouping and inclusion in general physical education classes. They present general CWPT procedures, student training in CWPT, and examples using data collection procedures and exercises with second grade students. The authors found that students were more successful using CWPT than with teacher-mediated approaches, and that students with disabilities were accommodated more appropriately than in traditional physical education.

- Cohen, P.A., Kulik, J.A., Kulik, C.C. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Research Journal, 19*(2), 237-248.

The authors examined the efficacy of school tutoring programs through a meta-analysis from 65 independent evaluations of school tutoring programs for school-age children.

They concluded that tutoring programs had significant and positive effects on academic performance and attitudes of those who receive tutoring, as well as children who serve as tutors. Neither tutors nor tutees changed dramatically in self-esteem as a result of tutoring programs. Finally, the meta-analysis raised some new questions about tutoring.

DeVries, D.L., & Slavin, R.E. (1978). Teams-Games-Tournaments: Review of ten classroom experiments. *Journal of Research and Development in Education*, 12, 1, 28-38.

In this article, the authors described a classroom program, Teams-Games-Tournaments (TGT), which addressed student values, student diversity, and basic skills and how each may improve learning. The authors provided information about how TGT works, its origins, research conducted to date, implications for teachers and researchers, how TGT is used in the classroom, and new directions for TGT. This program had relatively consistent positive effects on academic achievements, mutual concern, race relations, and peer norms supportive of academic achievement. Teachers can use TGT to enhance learning in any subject by giving students real reasons to master the material.

Elbaum, B., Moody, S. W., Vaughn, S., Schumm, J. S., & Hughes, M (1999). The Effect of Instructional Grouping Format on the Reading Outcomes of Students with Disabilities: A Meta-Analytic Review. [www.ncl.org/research/osep\\_reading.cfm](http://www.ncl.org/research/osep_reading.cfm)

This is a paper contained on the National Center for Learning Disabilities Web site. The authors have written an executive summary that focuses on reading interventions. Several structures of Peer Mediation and Interventions are noted.

Fuchs, D., Fuchs, L.S., Thompson, A., Svenson, E., Yen, L., Otaiba, S.A., Yang, N., McMaster, K.N., Prentice, K., Kazdan, S. & Saenz, L. (2001). Peer-assisted learning strategies in reading. *Remedial And Special Education*, 22, 1, 15-21.

In this article, the authors describe the rationale for the development of Peer-Assisted Learning Strategies (PALS) and provide a general overview of the program. In addition, they illustrate why additional PALS activities are required in order to address younger and older students' developmental needs. PALS is a modification of ClassWide Peer Tutoring that has been shown to enhance the reading development of low- and average-achieving students, as well as children diagnosed with learning disabilities, when implemented in grades 2-6 mainstream settings.

Giesecke, D.; Cartledge, G.; and Gardner, R. (1993). Low-Achieving Students as Successful Cross-Age Tutors. *Preventing School Failure* 37 (3), 34-43.

Four tutees correctly identified more sight words after a six-week tutoring program than they had before the program. This research, according to the authors, further validates the positive effects of peer tutoring, particularly as they relate to low-achieving students as tutors.

Greenwood, C.R., Arreaga-Mayer, C., Utley, C.A., Gavin, K.M., & Terry, B.J. (2001). Classwide peer tutoring learning management system: Applications with elementary-level English language learners. *Remedial And Special Education*, 22, 1, 34-47.

The authors report on the use of the ClassWide Peer Tutoring Learning Management System (CWPT-LMS), which is a form of intra-class, same-age, reciprocal peer tutoring designed for children. This particular study involved the literacy instruction of elementary English language learners (ELL) with Spanish as the primary language. It included 5 ELL teachers and 117 students in grades one through five in a multiracial/multiethnic urban elementary school. Results indicated that ELL made considerable progress in mastering new English sight vocabulary and spelling words over periods ranging from 15 to 21 weeks. In addition, both the students and teachers report a high level of satisfaction with the ClassWide Peer Tutoring program.

Johnson, D.W., & Johnson, R.T. (1986). Mainstreaming and cooperative learning strategies. *Exceptional Children* 52, 6, 552-61.

Johnson and Johnson found that Cooperative Learning had strategies congruent with the goals of integrating students with disabilities into general education classrooms. The authors identified essential elements of cooperative learning and specific actions for teachers to implement for most effective student results. In their research, they found that when appropriately conducted, students with disabilities in cooperative learning situations developed positive relationships with non-disabled peers during instructional and free time. Additionally, they found increased friendships resulting from cooperative learning experiences.

Johnson, D.W., Johnson, R.T., Stanne, M.B. (2000). Cooperative Learning Methods: A Meta-Analysis <http://www.clcrc.com/pages/cl-methods.html>

This Web site contains the entire document that is a meta-analysis of the research on cooperative learning methods from the mid-1960s to 1999. Many procedures had a significant positive impact on student achievement. The effectiveness of cooperative learning is illustrated in the results, which showed strong positive effects with consistency across a diversity of the procedures.

Kagan, S. (1994). Cooperative Learning. San Juan Capistrano, CA: Kagan Cooperative Learning.

The authors of this text provide explanations regarding the basic tenets of cooperative learning. The book is divided into sections for cooperative learning methods, lesson designs and learning beyond the classroom. Kagan organized and designed the book as a resource for teachers to incorporate tested cooperative learning strategies and activities into classrooms.

Kulik, J.A., & Kulik, C.C., (1992). Meta-analytic findings on grouping programs. *Gifted Child Quarterly*, 36, 73-77.

The authors conducted a meta-analysis examine the effects of grouping students by ability. Five types of instructional grouping were the focus of the analyses, these included multilevel classes, cross-grade grouping, within-class grouping, enriched classes for the gifted and talented and accelerated classes for the gifted and talented. Results indicate that students of higher ability generally receive the most benefits.

Students in lower ability groups had some benefits, but their gains were not as substantial as those for the students in the higher ability groups. Although grouping did not benefit all ability levels, grouping was not an academic detriment for any students.

Maheady, L., Harper, G.F., & Mallette, B. (1991). Peer-mediated instruction: A review of potential applications for special education. *Reading, Writing, and Learning Disabilities, 7*, 75-103.

In a multiple baseline design research study including students with mild disabilities and their non-disabled peers, the authors found positive outcomes using Classwide Peer Tutoring (CWPT) practices. Implementation of CWPT produced positive academic outcomes, 60% of the class earned A- grades, and no students obtained a grade below C, including the students with disabilities. The authors include recommendations and discussion about implications of CWPT at the secondary level.

Maheady, L.; Sacca, M. K.; and Harper, G. F. (1988). "Classwide Peer Tutoring With Mildly Handicapped High School Students." *Exceptional Children 55/1* 52-59.

The authors report on the effects of Classwide Peer Tutoring (CWPT) on the academic performance of 14 students with disabilities and 36 non-disabled peers in tenth grade classes. Randomly assigned tutor-tutee pairs quizzed each other verbally using study guides and took written weekly quizzes. Points were rewarded to teams for good quiz scores. Quiz scores progressed from 70 percent during baseline, to approx. 90 percent for students with and without disabilities in this multiple baseline research design.

Maher, C.A. (1984). Handicapped adolescents as cross-age tutors: Program description and evaluation. *Exceptional Children, 51,1*, 56-63.

The author designed a multi-element cross-age tutoring program with implementation in multiple school settings. A program description and outcomes are reported in this article. Maher reports that the program can be effective in enhancing academic performance of both tutors and tutees.

McMaster, K.N., & Fuchs, D. (2002). Effects of cooperative learning on the academic achievement of students with learning disabilities: An update of Tateyama-Sniezek's review. *Learning Disabilities Research & Practice, 17, 2* 107-117.

McMaster and Fuchs reviewed the literature from 1990 to 2000 researching the effects of cooperative learning strategies on the academic performance of students with disabilities. This study was designed as an update to the Tateyama-Sniezek 1990 review. The authors found that achievement outcomes are mixed. However, they did report that cooperative learning strategies that incorporated individual accountability and group rewards are more likely to impact the academic outcomes for students with disabilities. They caution that additional well-designed research is needed for conclusive evidence.

Palincsar, A.S., & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 2*, 117-175.

Palincsar and Brown conducted two experiments that studied whether reciprocal teaching could improve 7<sup>th</sup>-grade students with poor comprehension skills ability to learn from texts. The first experiment involved 24 poor readers and 13 average readers and compared reciprocal teaching to a typical classroom teaching method. Reciprocal teaching, including the activities of summarizing, questioning, clarifying and predicting, led to improvements in the quality of summaries and questions, gains in criterion tests, reliable maintenance over time, task transfer, and generalization to the classroom setting. The second experiment included 21 students and replicated many of the results as the first. In addition, the second experiment helped the authors to understand the underlying cognitive mechanisms involved in reading and studying.

Rosenthal, S. (1994). Students as Teachers: At-risk high school students teach science to fourth-graders. *Thrust for Educational Leadership*, 23, 36-8.

Rosenthal reviews a unique program developed by two schools, in which at-risk high school students taught science to a class of fourth-grade elementary students. This project gave the high school students an opportunity to take on the full responsibilities of a teacher, including, preparation of all lesson materials, preparing the lessons, meeting with adults, and getting to and from the school. After each lesson, the fourth-grade teacher met with the teenage teachers to reflect on the lesson. This pilot project received positive feedback from both the high school and fourth grade students. It provided the at-risk high school students with responsibility, expectations, and acceptance. In addition, the fourth-grade students produced the highest quality writing they had ever done in their journal entries and letters.

Slavin, R.E. (1983). When does cooperative learning increase student achievement? *Psychological Bulletin*, 94, 3, 429-445.

In this article, Slavin reviews research on the achievement effects of cooperative learning methods, where students work in small groups to learn academic materials. Field experiments lasted two weeks and took place in elementary and secondary schools. The results reported that among cooperative learning methods in which students study the same material together, only methods that provide group rewards based on group members' individual learning consistently increase student achievement. In addition, cooperative learning methods in which each group member had a unique subtask resulted in positive achievement effects only if group rewards were provided. The authors conclude that group rewards and individual accountability are held essential to the instructional effectiveness of cooperative learning methods.

Stevens, R.J., Madden, N.A., Slavin, R.E., & Farnish, A.M. (1987). Cooperative integrated reading and composition: Two field experiments. *Reading Research Quarterly*, 22, 433-454.

The authors conducted two studies evaluating a comprehensive cooperative learning approach to elementary reading and writing, known as Cooperative Integrated Reading and Composition (CIRC). Using CIRC, third- and fourth-grade students worked in learning teams for reading, language arts, and writing activities for twelve weeks and six weeks, respectively. The authors found significant effects in favor of the CIRC students in both studies on standardized measures of reading comprehension and

vocabulary, language mechanics, learning expression and spelling. The CIRC students also performed better on writing sample and oral reading measures. The authors conclude that these two field studies demonstrate that when classroom motivation, organization and instruction are integrated in the context of a cooperative learning program, student achievement in reading and writing improves.

Thurston, J.A. (1994). Art partners: A new focus on peer teaching. *School Arts*, 94, 41-2.

Thurston conducted a study entitled 'art partners,' a cross-age tutoring program that provides high school students with the instruction and opportunity to teach art to elementary students. The high school art students worked in cooperation with an elementary art teacher to present lessons on a bi-weekly basis for a year. The lessons included art history, aesthetics, criticism and production components. At the end of the program, the high school students completed evaluation reports and reported a gain in insight and greater understanding of themselves. The elementary teachers' responses to having high school teachers in their art classes were also positive.

Tateyama-Sniezek, K.M. (1990). Cooperative learning: Does it improve the academic achievement of students with handicaps? *Exceptional Children*, 55,5,426-437.

The author provides a review to date of research on the effects of cooperative learning on the academic performance of students with disabilities. A small number of studies met the criterion for inclusion in this study. The author concludes that additional research in this area must be conducted for conclusive evidence.

Top, B.L., & Osguthorpe, R.T. (1987). Reverse-role tutoring: The effects of handicapped students tutoring regular class students. *The Elementary School Journal*, 87, 4, 413-423.

The authors present information regarding the effects of students with disabilities tutoring younger, children without disabilities in reading. Participants in the study included 78 fourth- through sixth-grade students with learning disabilities or behavior disorders and 82 first graders without identified disabilities. All students were individually measured on reading ability prior to, and following twelve weeks of tutoring. Three attitudinal (self-esteem) measures were administered to students with disabilities. The authors reported that tutors self-esteem scores increased in perception of 'general academic' and 'reading/spelling' ability. Results from the tutoring intervention indicate that tutors and tutees scored significantly higher on both criterion and standardized reading measures than students assigned to control groups.

Wheldall, K., & Colmar, S. (1990). Peer tutoring for low-progress readers using 'pause, prompt and praise. In H.C. Foot, M.J. Morgan & R.H. Shute (Eds.) *Children Helping Children*. New York: John Wiley & Sons Ltd.

In this chapter, Wheldall and Colmar review eight different peer-tutoring studies conducted using 'Pause, Prompt and Praise' procedures. To measure the effectiveness of this procedure on reading, both tutor and tutees were compared before, during and after the period of tutoring. The authors were able to draw a number of tentative conclusions. Peer tutors can learn the 'Pause, Prompt and Praise' procedures quickly

and easily, as well as show a gain in reading skill because of their tutoring. In addition, setting up a peer-tutoring program requires some preliminary effort from teachers and provision for continual monitoring of the behavior of both tutors and tutees.

Wheldall, K., & Mettem, P. (1985). Behavioural peer tutoring: Training 16-year-old tutors to employ the 'pause, prompt, and praise' method with 12-year-old remedial readers. *Educational Psychology*, 5,1, 27-44.

Wheldall and Mettem conducted an experiment in which low-achieving 16-year-olds received training to help the reader to develop self-correction strategies and independence by reinforcing desired behaviors. The effectiveness of training such tutors was investigated through a tutorial program in which these 16-year-old students tutored twelve-year-olds with a low reading ability. The program consisted of 24 tutorial sessions over eight weeks. The tutees took a pre-test, post-test and delayed post-test measuring their reading ability and accuracy. In addition, each tutoring session was tape recorded for review after the program. The test results indicate a significant increase in the tutees reading accuracy by the end of the program. The authors report that the behavioral 'Pause, Prompt and Praise' technique offers a trainable set of tutoring behaviors that are effective and easily monitored.

### **Additional Resources used to complete this summary**

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