

USING PEER TUTORING TO FACILITATE ACCESS

With the passage of No Child Left Behind, education professionals are seeking research-supported practices that are applicable in classrooms and facilitate access to the general curriculum for students with disabilities. Peer tutoring incorporates research-supported practices with individualized instruction, which can be adapted to meet individual student needs. This brief introduces peer tutoring, an instructional method that facilitates access to the general education curriculum for students with disabilities. Targeted audiences include state and local technical assistance (TA) providers, administrators, and educators. This brief provides: (1) a definition of peer tutoring; (2) a brief description of three examples of peer tutoring, including how it promotes access to the general education curriculum and evidence of effectiveness; and (3) references for follow-up information.

It should also be noted that the references included in this brief have been cross-referenced with the extensive literature reviewed on peer assisted learning by the What Works Clearinghouse (WWC) as of July 2004. Eight references in this brief have been reviewed by the WWC, thus far. Of those eight, two passed the WWC criteria for evidence standards in the area of Reciprocal Peer Tutoring (Fantuzzo, J.W., Davis, G.Y., Ginsburg, M.D., 1995; Fantuzzo, J.W., King, J.A., & Heller, L.R., 1992).

PEER TUTORING

Peer tutoring is an instructional strategy that consists of student partnerships, linking high achieving students with lower achieving students or those with comparable achievement, for structured reading and math study sessions. According to Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller (2003), peer tutoring is “systematic, peer-mediated teaching strategies” (p. 204).

There has been extensive research on peer tutoring. Studies show:

- Use of cooperative learning structures and “group reward contingencies” can increase social motivation (Johnson, Maruyama, Nelson, & Skon, 1981; Wentzel, 1999; Slavin, 1990).
- Level of engagement influences student motivation to achieve classroom goals (Ryan & Deci, 2000).
- Peer tutoring is an economically and educationally effective intervention for persons with disabilities that can benefit both the tutor and tutee, socially and educationally by motivating them to learn (Miller & Miller, 1995).
- Peer tutoring interventions were more effective or showed greater gains for: a) students in grades 1-3; b) urban settings; c) low socio-economic areas; d) minority students; e) school-wide prevention programs; and f) when students controlled tutoring sessions (Rohrbeck, et al., 2003).
- Peer tutoring gives teachers the capability to accommodate a classroom of diverse learners to improve academic achievement across ability levels and content areas (Cohen, Kulik & Kulik, 1982; Cook, Scruggs, Mastropieri, & Casto, 1985; Johnson, Maruyama, Nelson & Skon, 1981).

This brief discusses three research-supported peer tutoring strategies: Cross-Age Tutoring, Peer-Assisted Learning Strategies (PALS), and Reciprocal Peer Tutoring (RPT). Variations exist among these strategies (e.g., some have flexible structures; others have very specific directions for implementation) but the underlying theory is consistent. The chart below provides a brief comparison of approaches.

Comparison of Approaches

Approach:	Cross-Age Tutoring	PALS	RPT
Content Area*	Multiple content areas	Math & Reading*	Multiple content areas
Number of Students	2	2	2 or more
Role of Student	Tutor or Tutee	Tutor & Tutee	Tutor & Tutee
Type of Interaction	Expert/Cooperative	Cooperative/Competitive	Cooperative
Type of Reward	Social Reinforcement	Social Reinforcement & Earn Points	Social Reinforcement & Earn Points
*Research exists in these content areas. Approach may be used in other areas.			

The following sections discuss each of these three peer tutoring approaches.

CROSS-AGE TUTORING

KEY POINTS

Tutoring procedures are unstructured

Tutors generally participate in some type of training

Math effects stronger than reading

Cross-Age Tutoring is a peer tutoring approach that joins students of different ages, with older students assuming the role of tutor and younger students assuming the role of tutee (Scott-Little, 2003; Hall & Stegila, n.d.). Student pairings may include a variety of combinations such as elementary students with high school students or older students with disabilities with younger students with disabilities (Miller & Miller, 1995; Hall & Stegila, n.d.). There are no stringent tutoring procedures established for Cross-Age Tutoring, however most tutors do engage in some type of training. These training sessions vary in range; some are scripted, others have few pre-set guidelines. Training sessions

tend to include a discussion of goals, problem solving strategies (academically and behaviorally), and appropriate feedback and reinforcement strategies (Barbetta & Miller, 1991). Tutors become models of appropriate behavior, organizing work, asking questions, demonstrating self-management, encouraging social interaction, and facilitating better study habits (Gaustad, 1993; Cohen, 1986; Barbetta & Miler, 1991; Miller & Miller, 1995).

How Cross-Age Tutoring Facilitates Access

Cross-Age Tutoring actively engages both tutors and tutees with disabilities in their education and gives them a feeling of control over academic outcomes (Kalkowski, 1995). Cross-Age Tutoring has been applied with students with varying disabilities (Utley & Mortweet, 1997). By involving students with disabilities in their education and giving them self-management tools students can generalize motivation into other areas. Students can use their skills to participate in Individualized Education Plans (IEPs), thereby taking an active role in their future (Miller & Miller, 1995). Students can practice appropriate social skills while being academically engaged (Barbetta & Miller, 1991).

Evidence of Effectiveness

There has been considerable research on the outcomes of Cross-Age Tutoring. A meta-analysis conducted by Cohen, Kulik, & Kulik (1982) reported moderate improvements in tutee and tutor achievement, tutor self-concept, and attitude towards the content area. Math effects tended to be stronger than in reading. Student achievement fared better in short, structured approaches (Kalkowski, 2001). Other studies report:

- Cross-Age Tutoring results in: “learning academic skills, developing social behaviors and discipline, and enhancing peer relationships” (Greenwood, Carta, & Hall, 1988, p. 264).

- Cross-Age Tutoring enhances the social skills of the student involved in the sessions (Foot, Shute, Morgan & Barron, 1990; Utley & Mortweet, 1997).
- Students benefit academically through practice and communication and self-esteem increases through social interaction and contribution to classroom learning (Gaustad, 1993).
- Cross-Age Tutoring can enhance self-esteem among older students who provide individualized instruction to tutees, and result in a more cooperative classroom and an improved school atmosphere (Gaustad, 1993; Gerber & Kaufman, 1981; Kalkowski, 2001; Schrader & Valus, 1990; Topping, 1988; Utley & Mortweet, 1997).

PEER-ASSISTED LEARNING STRATEGIES (PALS)

KEY POINTS

Structured approach for math and reading requiring set period of time for implementation: 25–35 minutes 2 or 3 times a week

Awarded “best practice” status by the U. S. Department of Education Program Effectiveness Panel for inclusion in the National Diffusion Network.

Unlike Cross-Age Tutoring, PALS is a structured peer tutoring program. PALS was developed in 1989 by Dr. Lynn Fuchs and Dr. Doug Fuchs (2001) in conjunction with Dr. Deborah Simmons. The strategies were derived from the Fuchs’ interest in developing a peer-mediated instructional strategy that incorporated elements of other research-based methods including Class-Wide Peer Tutoring (CWPT), Classroom-Based Measurement (CBM), Cooperative Integrated Reading and Composition (CIRC), and Reciprocal Teaching. Developers used these methods to enable a wider range of students to participate and increase success in school.

PALS offers specific programs in math and reading. Reading PALS is available for preschool through 6th grade and for 9th grade through 12th grade, with variations available for some grade levels. Math PALS is available for kindergarten

through 6th grade. In both content areas, the PAL strategies are designed to complement and not replace existing classroom reading and math curricula and instructional methods. In this structured peer tutoring program students pair off into player and coach roles to promote an equitable exchange; students exchange roles of player and coach during tutoring sessions.

The pairing of higher- and lower-achieving students is intended so students gain knowledge from each other through practice and reinforcement (students are still within the same skill level, there is not a huge discrepancy between ability levels). Teachers must carefully describe how the PALS strategies are done and how they relate to a particular lesson; they must closely monitor the roles taken on by each student, and interject when instruction is needed (Fuchs, Fuchs, Thompson, Svenson, Yen, Al Otaiba, Yang, McMaster, Prentice, Kazdan, & Saenz, 2002). Reading and Math PALS are each briefly discussed below.

Reading PALS

Reading PALS pairs students in a systematic way. First, students are ranked according to reading competence. Next, each student in the class is paired with another student. The pairs consist of one higher- and one lower-achieving student. The higher-achieving student always reads first, as a model for the other student. Students are monitored as they engage in the lessons.

The chart below describes the typical format for a **Reading PALS** lesson:

There are **three parts** to PALS sessions in which the partners take turns reading and describing what they read to each other.

Task 1: **Partner Reading** — the higher-achieving student reads aloud while their partner follows along correcting mistakes. After five minutes the students switch roles and reread the same selection.

Task 2: **Paragraph Shrinking** — students must state the main idea in ten words or less which encourages them to display and monitor comprehension while taking turns reading one paragraph at a time. They earn points when the goals of the exercise are met.

Task 3: **Prediction Relay** — a partner predicts what information will be in the next half page of text, and then reads out loud to find the information. This reading exercise includes use of the prior tasks (i.e., correcting errors and summarizing the text).

*Pairs earn points for every correct prediction and for appropriate summaries.

Retrieved January 22, 2004, from

<http://kc.vanderbilt.edu/kennedy/pals/about.html#reading>

Math PALS

Math PALS can be applied to many diverse learners at varying skill levels. According to Drs. Doug & Lynn Fuchs (2001) this approach uses structured interactions between students to encourage high-level feedback while in pairs. These interactions increase the level of participation on topical areas through verbal rehearsal, until the process becomes routine, and verbal rehearsal is no longer needed. In these activities students learn that strategies can be applied to other content areas. Students get step-

by-step feedback through their interaction during tutoring sessions. The tutoring sessions are reciprocal with students taking turns as tutor and tutee.

During PALS sessions, the program developers encourage teachers to assist students in making connections between the material presented and math concepts. They indicate that with structure and guidance from teachers, students can move past basic concepts and questions into conceptual knowledge. Methods that have enhanced conceptual math knowledge include: providing real-life examples, discussing meaning and answers to problems, and the use of manipulative or concrete representations.

Below is a typical format for a **Math PALS** lesson:

There are **two parts** to PALS sessions in which the students work through math problems and activities.

Task 1: **Coaching** — each of the partners work on math problems in a specific area (i.e., addition and subtractions). The “coach” questions the “player” in order to guide the activity. The “coach” has been trained in how to correct the “player.” This activity should last 15–20 minutes.

Task 2: **Practice** — all students receive a worksheet containing problems they just went over, some as difficult and some less challenging problems. Once they have completed the worksheet, they exchange papers and score them. This activity should last 5–10 minutes.

*Students earn points based on their cooperation, explanations, and accuracy.

Retrieved January 22, 2004, from

<http://kc.vanderbilt.edu/kennedy/pals/about.html#reading>

Researchers and teachers are continually modifying and adapting Reading and Math PALS to suit the variety of situations in which learning takes place. Stephenson & Warwick (2002) have found that PALS is easily adapted to different settings, and that, overall, peer tutoring is an effective approach to improved student outcomes.

How PALS Facilitates Access

PALS provides students with disabilities access to the general education curriculum and integrates them into the classroom without using a disproportionate amount of instructional resources

PALS enables teachers to integrate more strategic instruction during tutoring sessions because teachers can meet the individual needs of students with peer tutoring (Mastropieri, Scruggs, Mohler, Beranek, Spencer, Boon, & Talbott, 2001). PALS utilizes the inherent ability differences of students in various skill levels within the classroom setting. “An important advantage of [PALS] is that various groups of children in the same classroom can operate on different levels.... Teachers, in effect, can implement many ‘lessons’ simultaneously and can address ... the needs of many students with learning disabilities” (Fuchs, Fuchs, & Burish, 2000, p. 85).

Reading and Math PALS give teachers tangible strategies to implement in their classrooms, which assist them in meeting the needs of their diverse learners. Students are taught to develop their skills through specific techniques. They are encouraged to review and ask questions during tutoring sessions based on the teacher’s instruction. Students generate questions and draw conclusions through reciprocal peer interaction. The reinforcement they receive while working in groups motivates learning. These sessions create a classroom where student pairs can work on different levels and on different types of problems (i.e., word problems or counting) or at varying reading levels. Teachers can meet the individual needs of students while keeping the entire class engaged.

Evidence of Effectiveness

PALS learning strategy not only strengthens students' academic skills, it gives many students the opportunity to practice their social skills with peers in a natural setting (Fuchs & Fuchs, 2001; & Rivera, 1996). Teachers can create and simultaneously implement different lessons to address a greater range of learning needs (Fuchs et al., 2000). Other research shows:

- High-, average-, and low-achieving students, and students with learning disabilities make greater progress in reading in PALS classrooms than in typically structured classrooms (Fuchs et al., 2000; Mastropieri, et al., 2001).
- In elementary grades, children's reading competence can improve when they work collaboratively on structured learning activities. Student collaboration enhances success because the interaction can strengthen academic and social achievement (Fuchs, et al., 2002).
- Math PALS shows positive results in low- and average-achieving students, and students with learning disabilities. Students are able to elaborate and create more meaningful memories of concepts through their peer interactions and activities (Fuchs, et al., 2001).
- The questioning that occurs within the pairs generates deeper understanding that creates meaningful abstract representations (Fuchs, Fuchs, Hamlett, Phillips, Karns, & Dutka et al., 1997).
- PALS structured format, student reciprocal collaboration, and reinforcement are structured to facilitate learning (Fantuzzo, King, & Heller 1992).
- Teachers using Math PALS reported, "devoting more time to one-to-one instruction, less time to independent seatwork, and more time to peer-

mediated instruction, and relying more on systematic reinforcement methods” (Fuchs, & Fuchs, 1995, sec. 4).

- Reading and Math PALS strategies may assist teachers in preventing and alleviating many of the social problems (e.g., low self esteem, discipline issues) related to children, adolescents, and young adults (Hall & Stegila, n.d.).

RECIPROCAL PEER TUTORING (RPT)

KEY POINTS

Two or more students may be grouped together

Structured format

Students monitor and evaluate each other.

“Reciprocal Peer Tutoring is an intervention strategy combining self-management methods, group interdependent reward contingencies, and reciprocal peer teaching to promote academic and social competency” (Fantuzzo & Rohrbeck, 1992 p. 3). RPT is a collaborative learning strategy in which students alternate between the role of tutor and tutee. Unlike the previous peer tutoring strategies discussed, RPT may involve more than a one-to-one relationship. Students alternate roles while in pairs or groups. RPT has a structured format where “students prompt, teach, monitor, evaluate and encourage each other” (Fantuzzo, King, Heller, 1992, p. 332). Students are part of the educational process and are able to prepare instructional materials and receive feedback from peers. The alternating structure is designed to utilize group reward and interdependence to maximize learning and motivation. Group rewards are earned as all individuals in a group make progress. Students can select their rewards and goals from a list of teacher-prepared choices. Furthermore, students are accountable for monitoring and evaluating peer performance (Fantuzzo, et al., 1992; Pigott, Fantuzzo, & Clement, 1986). The idea is to “increase student choice and participation in the management of their own group interdependent reward contingencies and reciprocal peer teaching methods” (Fantuzzo & Rohrbeck, 1992, p.3).

Below is a typical format for an **RPT** lesson:

Peer tutors present tutees with a problem to solve using a flashcard with the answer on the back. The student computes the problem in writing on a worksheet.		
	If the Tutee Responds Correctly	If the Tutee Responds Incorrectly
Try 1	Tutor praises student and goes to the next problem	Tutor provides structured help (suggestions are on the back of the flashcard) and coaching, then the tutee attempts Try 2
Try 2	Tutor praises student and goes to the next problem	The teacher aid or teacher is called to coach (Help) the tutee in the correct-solution model, then the tutee attempts Try 3
Try 3	Tutor praises student and goes to the next problem	Tutee tries to solve the problem independently
<p>After 10 min. the pairs switch roles and continue for another 10 min.</p> <p>Once the tutoring is completed a 16-problem quiz covering what was practiced is given.</p> <p>Individual goals are combined with group goals and are rewarded if they met or surpassed the predetermined goals. Once five “wins” (goals) are achieved the pair can select a reward.</p> <p>(Fantuzzo, Davis, & Ginsburg, 1995; Utley & Mortweet, 1997)</p>		

How RPT Facilitates Access

Recently RPT has been used with students with mild disabilities in regular education settings and pullout programs to meet the individualized needs of students (Maheady, 2001). The cooperative role reversals are beneficial because students have a chance to be both the tutor and tutee (Fantuzzo, Riggio, Connelly, & Dimeff, 1989). The roles are equitable, which can promote an environment of acceptance. RPT gives students the opportunity to make choices throughout the learning process. By making choices, students enhance their self-management skills, and enhance control over learning and cooperation with others (Fantuzzo, et al., 1995; Fantuzzo, & Rohrbeck, 1992). Reciprocal tutoring and rewards motivate students for their teams' achievement. Rewards can be used as positive reinforcement to shape appropriate behaviors academically and socially within the classroom (Fantuzzo, et al., 1992). They can also motivate learners to participate and achieve in difficult content areas.

Evidence of Effectiveness

"The Reciprocal Peer Tutoring (RPT) intervention was developed specifically for urban, elementary school classrooms" (Fantuzzo, et al., 1995, p. 273). Like other peer tutoring approaches discussed, the reciprocal interactions in RPR promote social competence and peer acceptance (Fantuzzo, et al., 1995; Fantuzzo, et al., 1992; Heller & Fantuzzo, 1993; Pigott, et al., 1986), improves academic achievement, and decreases disruptive behavior (Utley & Mortweet, 1997). Other research findings show:

- RPT strategy resulted in greater improvements in cognitive gains, lower levels of subjective distress, and higher course satisfaction than students who received an attention placebo or participated in an independent unstructured learning format (Fantuzzo, et al., 1989).
- RPT has been successful with at-risk students and students with mild disabilities (Fantuzzo, et al., 1992; Maheady, 2001).

-
- Structured peer tutoring combined with group rewards tend to produce greater gains than unstructured peer tutoring without group rewards (Fantuzzo, et al, 1992; Utley & Mortweet, 1997).
 - The combination of a structured, reciprocal-tutoring format and group-reward contingencies for mathematics performance yield the highest academic gains in math (Fantuzzo, et al., 1992). Students can self-manage their behavior when they are actively participating in learning. They are choosing their goals and rewards (Fantuzzo & Rohrbeck, 1992).
 - Students engaged in these structured activities reported higher levels of competence and positive conduct than students in unstructured activities. Students may enhance intrinsic motivation with RPT (Fantuzzo et al., 1992).
 - Students experience more control over their progress (Fantuzzo & Rohrbeck, 1992).

CONCLUSION

Peer tutoring is an effective educational strategy for classrooms of diverse learners because it promotes academic gains as well as social enhancement. Programs can be successfully implemented at the classroom-level or on a wider scale at the school- or district-level. With administrative support and professional development, peer tutoring can help teachers cope with challenges such as limited instructional time, multiple curricular requirements, and appropriate social engagement among students. Students engage in active learning while staying abreast of the progress they are making. They are held accountable for their achievement, and motivated by social or tangible rewards. A goal of peer tutoring is to create self-managed learners with high self-esteem.

Peer tutoring is particularly advantageous in inclusive classrooms because it allows teachers to address a wide range of learning needs and engages all students

simultaneously. Regardless of ability level, students can engage in and learn from the lesson. Furthermore, the collaborative learning aspect of the strategy encourages positive social interaction between students in a classroom. By including traditional instructional strategies along with peer tutoring, teachers can utilize the ability differences inherent in an inclusive classroom, and promote accessible and successful learning for all.

FURTHER RESOURCES

Peer tutoring & Cross-age Tutoring

Classwide Peer Tutoring: Information for Families

<http://cecp.air.org/familybriefs/docs/PeerTutoring.pdf>

The Multigrade Classroom

<http://www.nwrel.org/ruraled/publications/multig7.pdf>

Peer Mediated Instruction

<http://www.cast.org/ncac/PeerMediatedInstructionandIntervention2953.cfm>

Peer tutoring & Cross-Age Tutoring

<http://www.nwrel.org/scpd/sirs/9/co18.html>

Student Grouping for Reading Instruction

<http://www.ericfacility.net/ericdigests/ed434435.html>

Maheady, L. (2001). Peer-mediated instruction and interventions and students with mild disabilities. *Remedial & Special Education*, 22(1), 4-15.

Topping, K. (1988). *The peer tutoring handbook: Promoting cooperative learning*. Cambridge, MA: Brookline Books.

PALS

Materials on PALS Reading and Math (manuals, training scripts, videos, student materials, brochures) are available from the following websites:

<http://kc.vanderbilt.edu/kennedy/pals/>

<http://kc.vanderbilt.edu/kennedy/pals/manuals.html>

http://www.ldonline.org/ld_indepth/reading/peer_assisted.html

Information on workshops and training sessions can be found at:

<http://kc.vanderbilt.edu/kennedy/pals/outreach.html>

NOTE: The developers of PALS recommend a one-day on-site training workshop for implementation. Depending on the workshop chosen, the presenter's fee ranges from \$1,000-1,500 plus travel expenses. All workshop participants need a PALS teacher manual. A site license can be purchased for any number of manuals at a cost of approximately \$10-15 per manual. (If 20 teachers participate, the cost would be \$200 plus copying costs.) Follow-up training is available. There are few additional costs necessary for a teacher to begin using PALS with students. (For more information visit the website listed above or call (615) 343-4782 or send an e-mail at PALS@vanderbilt.edu.)

REFERENCES

- Center for Effective Collaboration and Practice. (n.d.). Classwide peer tutoring: Information for families, 1-3. Retrieved January 23, 2004 from <http://cecp.air.org/familybriefs/docs/PeerTutoring.pdf>
- Cohen, J. (1986). Theoretical considerations of peer tutoring. *Psychology in the Schools*, 23(2), 175-186.
- 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.
- Cook, S.B., Scruggs, T.E., Mastropieri, M.A., & Casto, G.C. (1985). Handicapped students as tutors. *Journal of Special Education*, 19, 483-492.
- Education Programs That Work. (1995). Cooperative integrated reading and composition (CIRC) – Reading. Retrieved January 23, 2004 from <http://www.ed.gov/pubs/EPTW/eptw4/eptw4c.html>
- Faculty Awards (2003). Retrieved January 30, 2004 from Vanderbilt University, Peabody College Web site: http://peabody.vanderbilt.edu/sped/faculty_awards.htm
- Fantuzzo, J.W., Davis, G.Y., Ginsburg, M.D. (1995). Effects of parent involvement in isolation or in combination with peer tutoring on student self-concept and mathematics achievement. *Journal of Educational Psychology*, 87(2), 272-281.
- Fantuzzo, J.W., King, J.A., & Heller, L.R. (1992). Effects of reciprocal peer tutoring on mathematics and school adjustment: A component analysis. *Journal of Educational Psychology*, 84(3), 331-339.

-
- Fantuzzo, J.W., Riggio, R.E., Connelly, S., & Dimeff, L.A. (1989). Effects of reciprocal peer tutoring on academic achievement and psychological adjustment: A component analysis. *Journal of Educational Psychology*, 81(2), 173-177.
- Fantuzzo, J.W., & Rohrebeck, C.A. (1992). Self-managed groups: Fitting self-management approaches into classroom systems. *School Psychology Review*, 21(2), 225-264. Retrieved February 24, 2004, from EBSCO Database.
- Foot, H.C., Shute, R.H., Morgan, M.J., & Barron, A.M. (1990). Theoretical issues in peer tutoring. In H.C. Morgan, M.J. Shute, & R.H. Shute, (Eds.), *Children helping children*, (pp.65-92). New York: John Wiley & Sons.
- Fuchs, D., & Fuchs, L.S. (2001). Creating a strong foundation for mathematics learning with kindergarten peer-assisted learning strategies. *National Center on Accelerating Student Learning News: Promoting success in grades K-3*, 3, 1-4. Retrieved January 22, 2004 from: <http://www.vanderbilt.edu/casl/casl3.pdf>
- Fuchs, D., Fuchs, L.S., & Burish, P. (2000). Peer assisted learning strategies: An evidence based practice to promote reading achievement. *Learning Disabilities Research & Practice*, 15(2) 85-91.
- Fuchs, D, Fuchs, L.S., & Kazdan, S. (1999). Effects of peer-assisted learning strategies on high school students with serious reading problems. *Remedial & Special Education*, 20, 309-319.
- Fuchs, D., Fuchs, L.S., Thompson, A., Svenson, E., Yen, L., Al Otaiba, S., Yang, N., McMaster, K.N., Prentice, K., Kazdan, S., & Saenz, L. (2002). Peer-assisted learning strategies in reading: extensions for kindergarten, first grade, and high school. *Remedial and Special Education* (22), 15-21. Retrieved February 6, 2003 from: http://www.ldonline.org/ld_indepth/reading/peer_assisted.html
- Fuchs, L.S., & Fuchs, D. (1995). Acquisition and transfer effects of classwide peer-assisted learning strategies in mathematics for students with varying learning

histories. *School Psychology Review*, 24(4), 604-621. Retrieved January 30, 2004, from EBSCO Database.

Fuchs, L.S., & Fuchs, D. (2001). Principles for sustaining research-based practice in the schools: A case study. *Focus on Exceptional Children*, 33(6), 1-14. Retrieved January 22, 2004, from EBSCO Database:

<http://search.epnet.com/direct.asp?an=4765398&db=tfh>

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., Karns, K., & Dutka, S. (1997). Enhancing students' helping behavior during peer tutoring with conceptual mathematical explanations. *Elementary School Journal*, 97(3), 223-250.

Fuchs, L.S., Fuchs, D., & Karns, K. (2001). Enhancing kindergartners' mathematical development: Effects of peer-assisted learning strategies. *The Elementary School Journal*, 101(5), 495-510.

Gaustad, J. (1993). Peer and cross-age tutoring. *ERIC Digest*, 79, 1-7. Retrieved on February 24, 2004, from ERIC Database:

<http://eric.uoregon.edu/publications/digests/digest079.html>

Gerber, M., & Kauffman, J.M. (1981). Peer tutoring in academic settings. In P.S Strain, (Ed.), *The utilization of classroom peers as behavior change agents* (pp.155-188). New York: Plenum Press.

Greenwood, C.R., Carta, J.J., & Hall, V. (1988). The use of peer tutoring strategies in classroom management and educational instruction. *School Psychology Review*, 17(2), 258-275.

Hall, T. & Stegila, A. (n.d). Peer mediated instruction and intervention. National Center on Accessing the General Curriculum. Retrieved April 3, 2003, from:

<http://www.cast.org/ncac/PeerMediatedInstructionandIntervention2953.cfm>

-
- Heller, L.R., & Fantuzzo, J.W. (1993). Reciprocal peer tutoring and parent partnership: Does parent involvement make a difference? *School Psychology Review*, 22, 517-534.
- Johnson, D.W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89, 47-62.
- Kalkowski, P. (1995). Peer and cross-age tutoring. *School Improvement Research Series*, 18, 1-27. Retrieved February 24, 2004 from NW Regional Education Laboratory Web site: <http://www.nwrel.org/scpd/sirs/9/c018.html>
- Light, P.L., & Littleton, K. (1999). *Social processes in children's learning* (pp. 91-100). Cambridge, England: Cambridge University Press.
- Pigott, H.E., Fantuzzo, J.W., & Clement, P. (1986). The effects of reciprocal peer tutoring and group contingencies on the academic performance of elementary school children. *Journal of Applied Behavior Analysis*, 19, 93-98.
- Rivera, D.P. (1996). Using cooperative learning to teach mathematics to students with learning disabilities. *Spring LD Forum Council for Learning Disabilities*. Retrieved January 22, 2004 from: http://www.ldonline.org/ld_indepth/math_skills/coopmath.html
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Mastropieri, M., Scruggs, T., Mohler, L., Beranek, M., Spencer, V., Boon, R.T., Talbott, E. (2001). Can middle school students with serious reading difficulties help each other learn anything? *Learning Disabilities Research and Practice*, 16(1), 18-27.

Maheady, L. (2001). Peer-mediated instruction and interventions and students with mild disabilities. *Remedial & Special Education, 22*(1), 4-15.

About PALS (n.d.). Retrieved January 22, 2003 from Vanderbilt University, Vanderbilt Kennedy Center Web site: <http://kc.vanderbilt.edu/kennedy/pals/about.html>

About PALS: PALS math (n.d.). Retrieved January 22, 2004, from Vanderbilt University, Vanderbilt Kennedy Center Web site:
<http://kc.vanderbilt.edu/kennedy/pals/about.html#math>

About PALS: PALS reading (n.d.). Retrieved January 22, 2004, from Vanderbilt University, Vanderbilt Kennedy Center Web site:
<http://kc.vanderbilt.edu/kennedy/pals/about.html#reading>

Salvin, R.E. (1990). *Cooperative learning: Theory, research, and practice*. Englewood Cliffs, NJ: Prentice Hall.

Schrader, B., & Valus, V. (1990). Disabled learners as able teachers: A cross-age tutoring project. *Academic Therapy, 25*, 589-597.

Steinberg, L., Dornbusch, S.M., & Brown, B.B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. *American Psychologist, 47*, 723-729.

Stephenson, P. & Warwick, P. (2002). Peer tutoring in the primary science classroom. *Investigating: Australian Primary & Junior Science Journal, 17*, 11-14. Retrieved May 20, 2003 from: <http://search.epnet.com/direct.asp?an=5053847&db=tfh>

Topping, K. (1988). *The peer tutoring handbook: Promoting cooperative learning*. London: Croom Helm.

Utley, C.A. & Mortweet, S.L. (1997). Peer-mediated instruction and interventions. *Focus on Exceptional Children, 29*(5), 1-23. Retrieved February 24, 2004, from EBSCO Database.

Wentzel, K.R. (1999). Social-motivational processes and interpersonal relationships: Implications for understanding motivation at school. *Journal of Educational Psychology, 91*, 76-97.

For additional information on this or other topics, please contact The Access Center at accesscenter@air.org.

The Access Center: Improving Outcomes for All Students K-8

The Access Center is a cooperative agreement (H326K020003) funded by the U.S. Department of Education, Office of Special Education Programs, awarded to the American Institutes for Research
1000 Thomas Jefferson St. NW, Washington, DC 20007
Ph: 202-403-5000 TTY: 877-334-3499 Fax: 202-403-5001
e-mail: accesscenter@air.org website: www.k8accesscenter.org



U.S. Office of Special
Education Programs

This report was produced under U.S. Department of Education Grant # H326K020003 with the American Institutes for Research. Jane Hauser served as the project officer. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.



AMERICAN INSTITUTES FOR RESEARCH®