Effect of Peer Tutoring on the Arithmetic Skills of Severely Emotionally Disturbed Sixth Grade Students

By

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Research Questions

- *Will cross-age tutoring in Math influence the math achievement of sixth grade middle school Severely Emotionally Disturbed students?*
- *Can behavior problems be minimized using one-to-one instructional tutors?*

Rationale

I teach 6th grade students that are Severely Emotionally Disturbed (SED). Providing individualized instruction is a pressing concern for students with Emotional Disturbances. Although my class size is small (5:1 student to teacher ratio), I may have students functioning at academic levels ranging anywhere from as low as first grade performance to as high as tenth grade level. My students are categorized in the profound range of emotional disturbances and require a highly specialized therapeutic approach, which involves positive reinforcement and a variety of instructional and behavioral strategies tailored to the individual needs of each learner. Typical group characteristics include student inability to remain in assigned seating, to attend to task, being unprepared, fighting, introverted behaviors, sneaky or silly activities, etc. Even though students are taught according to grade-level Sunshine State Standard (Florida) objectives, specific goals for each child must be designed to facilitate understanding.

My greatest challenge as their teacher is being able to provide individualized instruction. In this setting, student misbehavior often impedes the academic performance of the group and affects their social growth. I wondered if my sixth-grade students' academic and social growth might benefit from cross-age peer tutoring, that is, engagement in important work with older students who could serve as role models as well as instructors. I thought about our program's 8th grade Severely Emotionally Disturbed students who had worked their way up through our level system – a token economy that is based on a

graduated set of rewards which move from extrinsic to intrinsic over time. Training students to become tutors, I reasoned, might be one way to increase the amount of one-to-one instruction for my 6th grade SED students and, at the same time, support the movement of the older students from the self-contained program to the general education setting.

Antecedents

My plan for cross-age peer tutoring was based on my reading of relevant research. Cooke, Heron, and Heward (1983), Franca, Kerr, Reitz, and Lambert (1990), and Berliner (1990) show that there are a number of benefits to having students function as tutors. Peer tutoring programs, they found, set the occasion for students to engage in academic responding and to benefit from it. Barbetta, Miller, Peters, Heron, and Cochran (1991) found that both tutors and tutees gain academically and socially from the interaction. Instruction can be individualized according to the specific skills the students need to master and can provide for intensive one-to-one interaction (Cooke, Heron, & Heward, 1983).

Student Achievement & Behavioral Impact

Numerous investigations have documented how the efficient use of instructional time increases the achievement of students (Greenwood, 1991; Rich & Ross, 1989; Sindelar, Smith, Harriman, Hale, & Wilson, 1986). In fact, Sindelar et al. (1986) and Greenwood (1991) concluded that the amount of time students were actively engaged in a learning activity was the best single indicator of improved achievement among at-risk students and that peer tutoring is a potentially useful means to actively engage students in learning activities. Praise, delivered appropriately can also make a difference in students' achievement and self-concept (Heward, Heron, Ellis, & Cooke, 1986). And social interactions, as Staub and Hunt (1993) found, can be affected in remarkable ways.

Benefits to Tutees

Peer tutoring has been widely used as an intervention strategy to enhance learning in several curriculum areas (Fulton, Leroy, Pinckney, & Weekly, 1994). These include increasing student on-task behavior (Heron, Heward, Cooke, & Hill, 1983), improvement in social skills (Franca et al., 1990) as well as in a variety of curriculum areas including reading (Barbetta, et al, 1991; Chiang, Thorpe, & Darch, 1980) and mathematics (Franca, Kerr, Reitz, & Lambert, 1990; O'Melia & Rosenberg, 1994).

Benefits to Tutors

Research also indicates that there are many benefits to the students who serve as tutors. These benefits include academic gains (Chaing, Thorpe, & Darch, 1980). Polierstock & Greer (1986) found that when tutors were trained and awarded tokens as social reinforcement during tutoring, appropriate academic and social performance as well as on-task behaviors of tutors increased in non-tutoring settings. Jenkins and Jenkins (1981) and Polirstok and Greer (1986) observed improved self-concept and attitudes towards schools and enhanced racial relations among students who served as tutors.

Benefit to Teachers

A teacher can personally monitor the individual progress of students during cross-age peer tutoring sessions (Reisberg & Wolf, 1986). In situations like the one in which I teach where students will benefit from a high degree of individualized instruction and maximum engagement, teachers must rely on available resources such as aides. Peer tutoring provides an excellent way for teachers to provide for more individualized instruction in today's diverse classrooms. Teachers can insure that students who require extra help during class assignments will get it while teachers take on more of consultant and facilitator roles as they monitor, counsel, and evaluate student progress.

Background/Context

Our program for severely emotionally disturbed children has four phases -- Diagnostic, Prescriptive I, Prescriptive II, and Transitional – each of which incorporates a system of rewards. Given the dynamics of our program and the volatile behavior of our students, structure and predictability are of considerable importance. Thus, we developed a token economy system in which students receive points for many different behaviors. These may be target behaviors, task behaviors, or expected classroom behaviors such as being prepared, completing a task, following directions, remaining in a seat, etc.

In the Diagnostic Phase, students are evaluated. An individualized educational program (IEP) is developed during Prescriptive Phase I. During this phase reinforcement of desired behaviors is continuous and extrinsically based. During each instructional period the student has the ability to earn a maximum of 10 points. Points are delivered contingent on the demonstration of a desired behavior in order to increase the frequency or rate of the behavior. Student performance is noted at the end of each instructional session in a behavioral checklist and tallied at the end of the school day. The total possible score a student can earn daily is 100 points. Students receive tokens that entitle them to food, toys, games, even clothing. Students can accumulate their tokens over the week and redeem them at the point store, an 8th grade student-led enterprise, on Fridays. They can also develop a savings account so that they can "buy" something of greater value.

As the student progresses through the phases, reinforcement gradually becomes intermittent and less dependent on the token economy. Our effort is to move the students toward intrinsic rewards. Once they enter the Transitional Phase, they are preparing to move into the general education program of the high school.

To test my hypothesis that cross-age peer tutoring would make a difference in my 6th grade students' academic and social performance, as well as support the academic and social growth of the 8th grade tutors, I selected 5 sixth grade students for tutoring. Their math proficiency (as determined by their scores on the *Woodcock-Johnson Revised Assessment*) was at the third or fourth grade level. Each tutee was paired with an 8th grade SED student whose math proficiency was at grade level and who had earned the privilege of becoming a tutor by earning the full complement of daily points in our token economy system and moving into the Transitional Phase: The tutors demonstrated independent functioning, positive social awareness, and high self-esteem.

Three of the student tutees were African-American -- two males and one female; two were Hispanic -- one male and one female. Three of the tutors were African American males. The other two tutors were female. One was Hispanic, and one was White-American. After talking with both sets of students, I paired same-sex partners since the students had indicated a desire to work with someone of the same gender.

Prior to beginning the cross-age peer tutoring program which was to span the approximately 9 weeks of the end of the school year, teacher-led tutor training sessions lasting approximately 45 minutes began. Tutor training included instruction in [a] transitions to and from tutoring; [b] practice procedures; [c] rules for behavior, [d] error correction procedures; and [e] positive feedback. Once the tutor training was complete, cross-age peer tutoring began. These sessions took place during a set 30-minute class period every Monday through Friday between mid-April and mid-June. Generally, these sessions followed a similar format: After the Math teacher presented the lesson, an instructionally relevant assignment was given to the students. Each assignment consisted of

- 2 *basic concept* problems, e.g., Three people have $4 each. Together, how much to they have?
- 10 *operation* problems, e.g., computation: 503-254= _____
- 3 *application* problems, e.g., If you had $50 to spend on groceries, what would you buy from the following list?

These areas matched the areas tested using the *Woodcock Johnson Test -- Revised*.

During the individualized training sessions, each tutor and tutee paired off. My role was to monitor and reinforce class-wide student performance and behavior. The following variables remained constant throughout the intervention: all five students were taught from the same textbook, were instructed using the same multi-sensory approach including the use of manipulatives, and the assignments were given at the same time each day. Additionally, the tutors, using point cards that could be redeemed at the point store by the tutee at the end of each week, reinforced appropriate behaviors.

A Change in Plans

Of the nine scheduled weeks, only seven were completed before our tutoring sessions were terminated. There were two reasons for the change: one had to do with the school building; one was related to student behavior. The first may have brought on the second.

At the end of the seventh week of the study, workmen arrived to remove the rug on the floor of my classroom and replace it with tile. As a result, our class had to move through multiple classrooms throughout the school day while the work was in progress and the 6th and 7th grade classes were combined. Our tutoring plan was shelved for the duration of the work – the entire eighth week.

Over the intended eighth and ninth weeks of the program, there was an escalation of negative behaviors such as fighting and name-calling particularly among the 8th grade students. In the ninth week, one of our tutors became explosive and unpredictable seemingly without a cause. Because the state of Florida through what is known as the Baker Act requires that when a person presents an imminent danger to himself or others, he or she should be removed from the classroom, this tutor was removed during the last week of our program. As a result, we had to cancel our tutoring sessions during the ninth week. Thus, the cross-age peer-tutoring program covered only seven of the intended nine weeks.

Tools and Data

For my study, I used a variety of research tools. I obtained data from:

- *Woodcock Johnson Test Revised, Math Calculation*
- A teacher designed Behavioral Checklist
- Anecdotal teacher notes/reflections
- 6th grade student work samples/journals (tutees)
- 8th grade student writing journals (tutors)

The *Woodcock-Johnson Test -- Revised* was used to measure 6th grade students' math proficiency. This test is a comprehensive math instrument with good diagnostic value. It is quite easy to administer and not too time-consuming. Three specific domains of *Woodcock Johnson* were administered: 1) Basic concepts; 2) Operations; and 3) Applications. The test was administered prior to the tutoring sessions and then again at the end of the sessions.

I also used a teacher made behavioral checklist and compared the behavioral data of the third quarter to that of the fourth quarter. Behavioral data is kept on an on-going basis for all students. The checklist I used focuses on the target behaviors, task behaviors, and

expected classroom behaviors that are the basis for rewards in the school's token economy. Thus, improvement in such behaviors such as entering and leaving school without incident, being prepared for class during periods 1 - 4, social behavior during lunch, completing a task, following directions, or remaining in one's seat during class were noted.

Additional tools were anecdotal notes and samples of student work. My notes focused on student interaction and involvement, as well as on organization and clarity of instruction by tutors. Student work samples provided insight about students' understanding of a concept. Work samples were posted daily by the tutors. On them, the tutors made specific notations of praise regarding students' work. Tutor and tutee journals provided insight about their opinions of a lesson. The tutors made comments to their tutees about what they should do the same or differently the next time they worked together. Tutees wrote what they liked about the lesson and what they learned that day.

Standardized Test Scores

Post-test scores of the *Woodcock Johnson Test -- Revised* show noticeable growth – more than one would normally expect for such a short period of time (See Table 1).

Table 1: Comparison Of Pre-Test & Post Test Scores

Woodcock-Johnson Revised Tests of Achievement

Student	**Grade Level Score in…**									
Tutee	***Basic concepts area***			***Operations area***			***Application area***			***Avg mo. Δ***
	Pre-test	***Post-test***	***Δ mo***	***Pre-test***	***Post-test***	***Δ mo***	***Pre-test***	***Post-test***	***Δ mo***	
#1	4.0	4.9	9	3.8	4.5	7	4.5	4.9	4	6.6
#2	3.8	4.3	5	3.0	5.0	20	4.0	4.0	0	8.3
#3	2.7	3.9	12	3.0	3.8	8	3.4	4.2	8	6.9
#4	3.3	3.9	6	3.1	3.9	8	3.5	3.9	4	6
#5	4.2	4.6	4	4.5	5.8	13	4.6	5.0	4	7
avg. Δ in mos.			7.2			11.2			4	

Pre-test scores indicate where my students were at the beginning of the study in terms of grade level and month: thus, a 3.8 indicates a student whose math level at the beginning of the cross-age peer-tutoring program is third grade, eighth month. Post-test scores indicate where the students were at the end of the intervention and are indicated by grade level and month.

Overall, each child improved an average of 6 months with the greatest improvement occurring in the area of Operations. As noted above, Operations problems refer to those problems that require the student to know what to do when they see an item that requires addition, subtraction, multiplication, or division or a combination of these. Operations comprise the largest number of problems on the test. Thus the improvement in this area is especially notable. Another remarkable piece of the data is the dramatic overall improvement of child #3 – especially in the area of Applications.

As I reflect on these gains, I realized that my colleagues and I made some important decisions that probably had an impact on these outcomes. We chose to make extensive use of multiplication rap tapes. We sang with the students – both tutors and tutees -- daily and worked to help them use the rhythm and words of the songs to memorize their tables and facts about multiplication. Looking back, now, I think that it was this intervention coupled with the intensive work of the tutors that may have accounted for the impressive improvements in the area of Operations.

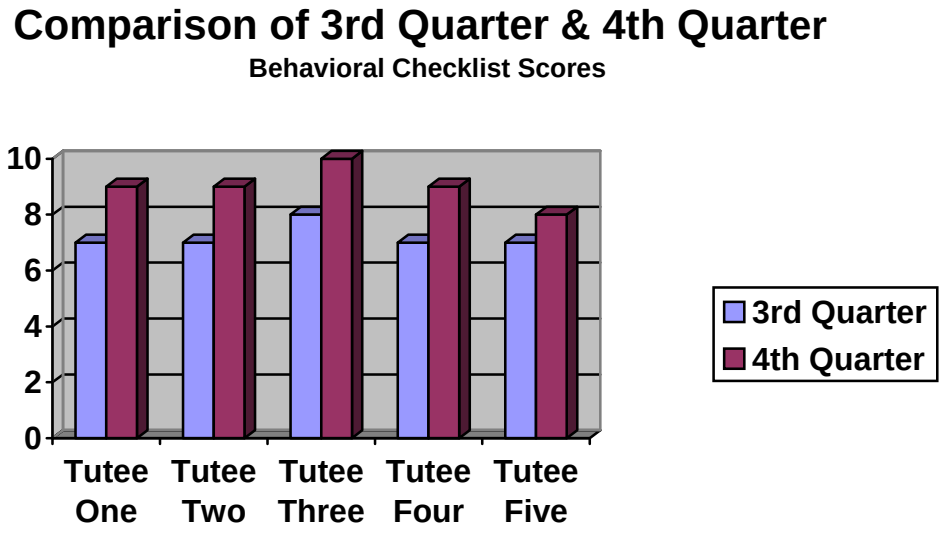
I have also given a lot of thought to the improvements made by Student #3. Again, looking back at my various records from that period, I realized that the child's home life changed dramatically during the period of the cross-age peer-tutoring intervention. The child had been a victim of sexual abuse and had been in a number of foster home arrangements. Just before my study began, the child was moved to a setting

in which the foster parent took on many of the responsibilities that teachers and schools normally expect of parents – supporting the child's work in school by attending parent-teacher conferences, following up on homework, and monitoring the child's attendance at school. The dramatic shift in the achievement levels of Child #3 (see Table 1) and in the child's behavior (see Table 2) during the period of the study suggests that the supportive involvement of the foster parent may have played a pivotal role for the child.

Checklist Behavioral Data

Although the tutoring sessions were only held during a 30-minute daily period, behavioral improvement was noted for all five of the student tutees (see Table 2).

Table 2



I compared the behavioral data of the third quarter to that of the fourth quarter and noted substantial shifts with students coming much closer to attaining the full 100 points that were available to them each day. Comparison of the average weekly behavioral checklist data of the first seven weeks of the third school quarter to the first seven weeks of the fourth school quarter indicates the tutee average weekly behavioral scores rose

during the fourth quarter of the school year. While I cannot be sure that this change is a direct by-product of cross-age peer tutoring, it is interesting that no such shift occurred during the other quarters of the school year.

Teacher Anecdotal Notes

During the period of the cross-age peer-tutoring intervention, I dedicated a minimum of 15 minutes to reflective writing at the end of the school day to keep track of things that caught my attention. My notes indicated an overall acceptance by the students of the tutor/tutee relationship and support the data of the checklist. Both tutees and tutors related to one another in a positive manner. Tutees seemed to respect and welcome their tutors and over the seven weeks of observation they seemed to have found ways to build and maintain collaborative relationships. The tutees' verbal responses and physical mannerisms seemed appropriate. They learned to share, help, and respect their students.

From my perspective, the tutors did a fine job. Their lessons were presented in a clear and organized manner. I was particularly impressed by the use of praise as encouragement by the tutors to the tutees. For example, my notes indicated the following: "You're doing so good", "I'm proud of you", and "You're so smart". For the most part, praise seemed to be genuine and was given immediately after a correct response. Tutees seemed to enthusiastically look forward to the time with their tutors, and, most important to me, they seemed to be engaged in the lessons. I also noted that good eye contact was maintained throughout most lessons.

Student (Tutees) Work Samples

Student work samples demonstrated improvement from week to week. Academic scores rose steadily for each of the tutees. I saw major improvement in computation skills: Tutees had daily homework assignments to study times tables. Rote repetition of times tables

coupled with the rap songs described above seemed to help the students become confident about their work, and this was apparent in the changes that I was able to see when I compared work samples from this period with ones gathered at earlier times during the year. (Please provide some examples here.)

Tutors' Writing Journals

I had given the tutors specific trigger questions such as: "What did you like about the lesson?," "What would you do differently next time?," "What would be the same?," "Do you think you were effective? Why/Why not?" During the first week of tutoring, most of their reflections centered on having confidence in themselves: **"**I'm learning that if you really try hard, you can do it." They expressed a desire to do a good job: "Today's lesson was sort of boring. Maybe it's cause I'm tired. I wonder how teachers do it when they're not up to it. I really want to do a good job. Maybe I should ask my teacher's opinion of how I'm teaching."

As the weeks passed, tutors' thoughts seemed to shift towards how the lesson went and how well the tutee understood the concept presented: "My student was funny today. I think she might be nervous. She keeps laughing when she doesn't know the answer." They also asked questions about themselves and their students. Some questions were very deep:

> I like giving points to my student. I wish somebody did that for me at home. Sometimes I think we have to teach the world how to be happy. It's crazy how us kids end up in special education when it's the parent who messed up in the first place. This is something I will continue to do . . . being nice.

By the end of the tutoring sessions, all of the tutors seemed engaged and to have developed ideas about how to help their tutees learn best.

Tutees' Writing Journals

The tutees wrote about their experiences in a positive manner. They expressed satisfaction about understanding how to do three digit-multiplication problems with carrying. They wrote out the steps to do when performing divide and check. They also wrote the meaning of word-problem trigger terms such as what is the sum of, what is the difference of, how many are left, etc. They seemed to exude pride in their accomplishments and in their tutors. One wrote "This is so easy! But it's because L.J. is a good teacher." Another wrote, "This is the best thing that happened to me after chocolate milk . . . understanding how to divide."

Analysis

I have no doubt about the tremendous power behind cross-age tutoring. I documented benefits in student achievement and positive behavioral change. I also documented benefits for the tutors. And as a teacher, I gained very valuable knowledge on how to best reach our students. Taking on the role of observer gave me the opportunity to design lessons that truly reach the individual need of the student. The tutoring sessions provided me with valuable opportunities to see my students' strengths and to observe them working with others. Thus, I gained insight about how to work more effectively with each of my students.

My data suggests that providing students with individualized instruction in the form of cross-age tutoring has a positive effect on them both academically and socially. Results from my study were consistent with the research in the use of peer tutoring strategies to increase academic achievement of students in literacy (Chiang, Thorpe, & Darch, 1980; Leland & Fitzpatrick, 1994) and math (O'Melia & Rosenberg, 1994). The tutors and tutees showed remarkable behavioral improvement and improved self-concept and attitudes toward school (Barbetta et al, 1991; Jenkins & Jenkins, 1981)

From a teaching standpoint, I found that the cross-age peer-tutoring program was easily adaptable to the classroom routine. In spite of the fact that our setting seems unstable from day to day due to the students' emotional volatility, both sixth and 8th grade students seemed to enjoy their experience and to participate with gusto in the tutoring program. The student interest level and engagement in the lesson was magnificent. I was especially impressed by the depth of some of the comments made by the tutors. They became more confident about their own teaching, and they began to really think—it seems—about how learning happens and how to support it. They moved from words such as "I think that Miss Tutee…" to more concrete statements such as "Repetition works well with Miss Tutee." My guess is that they also learned the material better themselves.

Student reactions to tutoring were a critical aspect of my research. Their positive responses to their tutors and the remarkable improvement in their behavior was, I think, particularly noteworthy because my sixth-grade students are typically in the Prescriptive I or II phase of our system. The primary focus of these phases is learning style, social skills, motivation, frustration tolerance, and responses to environmental conditions including interactions with peer students. It is my opinion that the behaviors of the tutees improved as a result of the tutors modeling appropriate classroom interaction and increased personalized praise, feedback and encouragement. Having just recently "been there" themselves, the tutors, it occurs to me, may have a keener sense than I do about what their tutees are thinking and feeling, and thus, may be able to say the right thing at the right time. The tutors' journal writings enabled me to step in and provide emotional support when they were feeling wobbly and to help them to target their instruction when they were not sure about what to do next.

I have given a lot of thought, too, to the misbehavior that began to emerge among 8th graders and even among our tutors during the eighth and ninth weeks of the program. I wonder whether it might be explained as "separation-anxiety." The 8th graders were about to

graduate. In a self-contained program like ours where bonding takes place between students and teachers over three years, it is natural that children will be both excited and apprehensive about moving on, and, for our students, it is probably more difficult than it is for other 8th graders to verbalize their feelings about graduation. If one adds to that, the relationships that inevitably developed between the 8th grade tutors and their 6th grade tutees, the misbehavior seems almost inevitable. Looking back now, I feel that we should have seen it coming and been able to prepare for it, even avert it.

On the whole, my analysis of the data leads me to conclude that the cross-age peer tutoring did in fact influence the Math achievement of 6th grade middle school Severely Emotionally Disturbed students. I am convinced that the careful preparation and continuing support of the tutors that was made possible by observing them and reading their journals was critical to the successful development of interpersonal relationships between tutors and tutees and to the tutors' successful instructional interactions. Furthermore, I am more secure now than I was when I began this study that the benefits of cross-age peer tutoring for tutees, tutors, and teachers are such that this instructional intervention should be a regular and well-supported tool that teachers in both general and special education classes routinely use.

Conclusions and Policy Implications

My experience suggests to me that knowledge of when and how to use cross-age peer tutoring and skill in its implementation requires a team approach at the school and classroom level and support from school and district administration for teachers to develop the "know how" required. One of the most powerful aspects of my experience with cross-age peer tutoring was the opportunity to reflect on the experience with my colleagues and to coordinate our activities in ways that made the students' experiences fluid and successful.

That we did not anticipate the problem of "separation anxiety" at the end of the year had everything to do with our not having worked with one another in this way before.

At the school level, administrators should encourage and promote cross-age peer tutoring programs by facilitating teacher attendance at in-service teacher education programs. Once teachers are trained in a school-wide cross-age peer tutoring program, team leaders or designated teachers could be provided with time set-aside to implement programs that they design with teachers by training tutors to manage lessons and by monitoring the tutoring program on an on-going basis. Teachers should be encouraged to take risks and engage in this type of classroom collaboration.

This experience has taught me the importance of embedding the tutoring sessions in the regular flow of the day; they should not be 'pull-out' programs. Furthermore, it seems appropriate to recommend that the opportunity to serve as a tutor should be available to students as an elective in their coursework.

In conclusion, the implications appear to be many and it is my belief that if a collaborative approach is taken by the district, school administrators, and classroom teachers, the benefits of cross-age tutoring as an effective instructional strategy in the classroom, is a venture that will help schools confront the challenge of meeting the diverse needs of students within the classroom.

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