Classwide Peer Tutoring

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ABSTRACT: *The purpose of this article is to discuss classwide peer tutoring as an effective instructional procedure. The article is organized into three major sections: (a) general principles of instruction, (b) description of classwide peer tutoring procedures, and (c) review of effectiveness data concerning classroom process (i.e., ecological and behavioral factors) and student achievement outcomes. It concludes with a discussion of the procedure and areas of future research and application.*

■ The classwide peer tutoring system developed at the Juniper Gardens Children's project is, in large part, the result of efforts to improve instruction for minority, disadvantaged, and/or learning disabled children. This procedure has been developed through programmatic research over the last 10 years. This research is beginning not only to yield important facts about school failure and achievement, but to demonstrate principles and procedures that are basic to effective instruction.

The purpose of this article is to provide an overview of these principles, procedures, and research. In doing so, it will describe principles of instruction that have been developed, describe how the procedures are implemented, and provide a brief review of studies that demonstrate effectiveness of the approach.

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PRINCIPLES OF INSTRUCTION

Many of the principles and procedures to be described resulted from dissatisfaction with instruction in regular classroom settings (Greenwood, Whorton, & Greenwood, 1984; Hall, Delquadri, Greenwood, & Thurston, 1982). The "Opportunity to Respond" concept consequently developed, which is exemplified in the classwide peer-tutoring approach.

One apparent factor emerged from direct observation research. Children were not actively engaged by the curriculum or the teacher's lesson (Hall et al., 1982; Greenwood et al., 1985; Stanley & Greenwood, 1983). For example, one early attempt to measure generalization of one fourth grader's oral reading tutoring, from home to the classroom, was prevented due to no opportunity to read during a 2-week period (less than 10 seconds of reading were observed). The child typically sat alone at his desk during reading instruction while the teacher worked with groups. When his group was called for instruction, the reading period was usually over and it was time to move on to another activity. On the average, he was actively engaged for only 8 minutes of the

60-minute reading period. This child was subsequently placed in a classroom for learning disabled (LD) students where he received approximately 6 minutes of oral reading practice each day. Within 2 weeks the child's correct oral reading rate had increased from 15.2 words per minute to 45.7 words per minute, while his error rate decreased from 9.8 error words per minute to 2.4 words per minute. Two years later this child, who originally scored at first grade, second month, was reading at the fifth grade, eighth month on a standardized test.

This example illustrates many of the general principles on which classwide peer tutoring systems are based, and which have since been confirmed empirically. These include opportunity to respond, functionality of key academic skill areas, and behavioral principles that facilitate responding.

Opportunity to Respond

According to Hall et al. (1982) and Delquadri and Greenwood (1981), a necessary condition for academic achievement is an arrangement in which there is frequent interaction between teacher and/or classroom antecedents and student responding. Refinement and operational specification of the opportunity to respond model of instruction was completed by Greenwood et al. (1981) in terms of its theoretical constructs and by Greenwood, Delquadri, and Hall (1979) and Stanley and Greenwood (1981) in terms of a measurement system consisting of in-class observational coding. Within the context of the model, learning is now viewed as a product of eco-behavioral interaction in the class; that is, environmental factors (e.g., time allocated for instruction, curriculum, tasks presented to students, and teacher behaviors) and the levels of active student responding (e.g., reading aloud, writing, and talking academic) are considered critical to student achievement. More recently, Greenwood, Delquadri, and Hall (1984) and Greenwood, Dinwiddie et al. (1984) experimentally validated the crucial relationship between varied ecological/teaching arrangements, student response levels, and student achievement outcomes.

In our fourth grade example, the child was failing due to a lack of systematic opportunity to respond. The child's engagement in oral reading, writing, and instructional interaction with the teacher was low, but when placed in the special class, dramatic improvement occurred as evidenced by his response levels. In the former, the teacher used the traditional three-reading-group format in which the child was to be working individually at his seat as other groups met with the teacher. Instead, when unsupervised, the child engaged in off-task behaviors. During small group instruction, which often lasted less than the scheduled 20-minute period, this child was seldom called upon by the teacher to read or answer questions. Instead, the child passively watched the teacher as she provided instruction.

When placed into the special class, the child's behavior changes could not be explained in terms of social reinforcement or the use of contingencies alone. The LD teacher had folders on each student's desk containing worksheets and assignments. In addition, the teacher assigned 200 word passages in a basal text, which the child was required to read orally to her, individually, every day. In this class there was much less emphasis on explanation and verbal instruction, but more in the way of corrective feedback and praise for correct student response. Class organization and preparation enabled the child to respond academically. Teaching behavior was more incidental, designed to maintain high levels of responding, through correction and feedback.

Classwide peer-tutoring systems represent an alternative approach for creating the student responding described in this example. The problem in developing such a system became one of how to achieve the same effect in regular classrooms that have more complexity due to heterogeneity of student skill levels and larger numbers (Elliott & Delquadri, 1981). It was possible for the LD teacher of nine or ten students to go around and listen to each child read individually for 5 to 10 minutes, but how to achieve a similar effect in a larger class was at issue.

Classwide peer tutoring achieves this objective by allowing peers to supervise their classmate's responding. As a result, every child in a class can receive 10 minutes of direct practice time on a key instructional skill, whether it is math, spelling, vocabulary, oral reading, or comprehension. It is not unusual for children to increase their academic behaviors from 20% to 70% during classwide peer tutoring. In one study, active student responding (i.e., read aloud, read silent, talk academic,

and writing) improved from 28% during the regular 60-minute reading period to 78% when classwide peer-tutoring procedures were implemented across three consecutive instructional activities: oral reading, comprehension, and workbook activities (Elliott, Huges, & Delquadri, 1984).

Functionality of Key Academic Skill Areas

Another principle in the use of classwide peer-tutoring systems is selection of academic target behaviors and skills that teachers use to determine a child's progress. We have found that selecting teacher designated behaviors for instruction, which may be different from the specified learning objectives in the text or the district curriculum guide, is a greater likelihood that these behaviors will be maintained by the instructional environment and become more functional for the child. Thus, classwide peer tutoring has been used with (a) textual oral reading; (b) answering comprehension questions; (c) reading workbook practice; (d) practicing spelling word lists; (e) practicing math facts; and (f) practicing vocabulary words, their meanings, and definitions.

For this reason, classwide peer tutoring is most often applied to the materials that have been adopted by the school district. For example, if the class in which tutoring is implemented uses a particular basal reading text, then the classwide peer-tutoring system is adapted to that text and associated materials. Earlier research indicated that peer and parent tutoring produced more robust changes and greater transfer to the classroom when similar materials or texts were used during tutoring (Delquadri, Copeland, & Hall, 1976; Harris, 1981).

Another aspect of selecting skill activities is that the behaviors should be molar and as close to teacher outcome criteria as possible. For example, textual oral reading in the form of sentences read, words written, words spelled correctly, and comprehension questions answered correctly are favored. These are in contrast to phonetic rules and decoding skills, studying definitions, determining word roots for spelling words, and the varied approaches or rules that can be applied to comprehension. Classwide peer-tutoring research has shown that the immediate and robust changes in student performance desired by teachers can occur at this molar level. For example, classwide peer tutoring has a direct impact upon student reading rate performance. This effect is not evident with decoding skills that contribute rather indirectly to assessments of reading performance. In classwide peer tutoring few assumptions are made regarding task analysis and correct placement of the children into the correct level of a reading text. Research has demonstrated that in class reading placement, according to assessment procedures provided in basal text, is often inexact and that children can and often do learn skills out of sequence. The sequence may have more of a presumed importance to the desired behavioral outcome, as opposed to a real one. Although it is better to match children to the materials, they can benefit substantially from classwide peer tutoring even when they are placed in reading texts up to two and three levels above their basal placement scores.

Behavioral Procedures

In addition to increasing "opportunities to respond" and selection of functional academic behaviors and skills, classwide peer tutoring is dependent upon behavior analysis principles. The first consists of reinforcement for correct responding. In classwide peer tutoring, individual and group contingencies have been programmed, as well as social and token reinforcement.

One of the most important and necessary principles is the reinforcement that is arranged between the teacher and the individual child. The program structures the teacher to systematically review the child's performance gains (e.g., weekly oral reading or Friday spelling test scores). This allows the teacher the opportunity to provide student recognition and praise, individually. Without this procedure, it has been found that often the child improves dramatically without the teacher being aware. Of course, when the child makes dramatic improvement on some skill and the teacher acknowledges it, one of the most powerful contingencies available have been set into operation. This component, which enables the teacher to view immediate beneficial effects and provide reinforcement based on student progress, has been reported by teachers to be one of the most important for maintaining both the child and teacher in the procedure (Elliott et al., 1984).

The second principle consists of peer-mediated contingencies, which add another powerful reinforcement mechanism to the procedure (i.e., teams and tutors). This is achieved by establishing teams, each of which attempts to earn the higher score and recognition as, "the team of the week" (group contingency). When acting as tutors, children are trained to award contingent points and use an error correction procedure (individual contingency).

A third principle consists of the use of posting and feedback concerning individual and group performances. The points that the children contribute to team competition are emphasized publicly as are the daily and weekly team totals.

CLASSWIDE PEER-TUTORING PROCEDURES

Classwide peer-tutoring procedures have been implemented in many varied settings (i.e., mainstreamed, resource room, self-contained LD, educable mentally retarded [EMR], and behaviorally disordered [BD]). In most subject areas, the procedure requires 30 minutes since the most effective time block is one in which each child receives 10 minutes of tutoring. Thus, 10 minutes can be planned for each student to serve as a tutor, 10 minutes to be tutored, and 5 to 10 minutes to add and post individual and team points. Students are randomly assigned to one of two teams every Monday on which they remain for the entire week. Restructuring weekly teams assures that all children are on a winning team sooner or later.

Daily Procedure

Students are reminded of their tutoring partners and are signaled to move to them by the teacher. A timer is set to signal the beginning of the first 10-minute period. The tutee responds to the material (e.g., reading sentences in the assigned passage) and earns points for his or her team. The tutor observes the child read, awards points, and corrects errors. Two points are earned from the tutor for reading a sentence without errors. One point is earned for successfully correcting an error identified by the tutor. Word substitutions, omissions, and hesitations are counted as errors. To cor-

rect the error the tutor pronounces the correct word and the child rereads the sentence until it is correct. In spelling and math, points are based on saying and writing the required response. After orally spelling and writing the word, for example, the child repeats it back to the tutor. If it is correct, the tutor tells the child it is correct and to give him or herself two points. If it is not correct, the tutor spells it correctly from a list. The child then writes it correctly three times, earning one point, and continues on with new material. The teacher supervises the tutoring by moving among the students providing assistance and awarding bonus points to tutors for correct tutoring behaviors. Tutees are also given bonus points for responding immediately and for working cooperatively with their tutor. This continues through the first 10 minute period after which the second tutoring period begins. Here tutors become tutees and vice versa, following the same procedures. Individual points are summed and reported aloud to the teacher following the last tutoring period. Students' points are written on a large team chart that produces the team totals. The winning team is applauded for winning, as is the losing team for making a good effort.

Student Training

The initial training of students is accomplished using explanation, modeling, and practice with feedback. The teacher begins by explaining how the "game" (winning teams, points, and tutoring) works. Here, the teacher outlines the rules of the game and the method for earning and scoring points. The teacher then demonstrates tutoring by having one child from the class read or spell words as the teacher acts as the tutor. The delivery of points is demonstrated as is the error correction procedure. The teacher then selects two more children who tutor one another for 1 minute as the others watch and the teacher gives feedback highlighting the correct error correction procedure. After a few more demonstrations, the teacher has all children try it. During this time it is important for the teacher to go about the class monitoring tutoring, giving corrective feedback, and delivering bonus points for good tutoring. Usually, children are well trained to perform tutoring at the end of the first session, but with first and second graders it may be necessary to train them over several sessions

and days (cf. Carta, Dinwiddie, Kohler, Delquadri, & Greenwood, 1984).

REVIEW OF EFFECTIVENESS DATA

Controlled studies examining the effects of classwide peer tutoring have been conducted by the authors, their students, and independent investigators. These studies have included single-subject and experimental-control group designs. Studies have been conducted primarily with inner-city Chapter 1 students and special education students (i.e., LD, BD, autistic, EMR, and hearing impaired).

Hall et al. (1982) and Delquadri et al., (1983) demonstrated that third graders' spelling errors could be reduced to a range of 1 to 3 for all students when the classwide tutoring system was used during the week. Using an ABAB reversal design, tutoring was demonstrated to be more effective in reducing spelling test errors than the teacher procedure, which included use of group instruction, a spelling text, and workbook. Particularly interesting was the finding that students in the class who averaged more than 8 errors per week could perform as well as the other students when spelling was taught using classwide peer tutoring (e.g., 1 to 3 errors).

Whorton and Delquadri (reviewed in Greenwood, Delquadri, & Hall, 1984) replicated these findings in oral reading using 12 LD students. Oral reading rates were systematically probed, after reading instruction, on reading passages assigned daily. Students typically doubled their rates of words read correctly per minute (CWPM), increasing from a mean of 24 CWPM during baseline within the regular basal reading program, to a mean of 48 during classwide peer tutoring. Reading error rate (EWPM) declined from a mean of 4.4 to 1.7 during the tutoring program. These effects were also repeated in the latter half of this ABAB experiment. This study also demonstrated that improvements in oral reading covaried with increased reading behavior of students during the reading lessons. For example, reading aloud averaged 2% at baseline during instruction and increased to 27% during tutoring. Similar values for silent reading were 4% and 34%. Thus, it appeared that tutoring increased the opportunity to read and master the passages which was not the case during the teacher's method of basal reading instruction.

Greenwood, Dinwiddie et al. (1984) reported three studies comparing classwide peer tutoring in spelling, vocabulary, and mathematics to teacher-developed instruction. In their first study, 88 children in three third-grade classrooms and their teachers participated. This study replicated prior results in which classwide peer tutoring reduced errors on Friday tests. However, this study added a more stringent design by controlling the order in which the methods were introduced. Tutoring was introduced first (BAB) in two classrooms and second (ABA) in the third classroom. In each case, students (including the lowest performing in the class) mastered the content best during tutoring (B) regardless of whether tutoring occurred before or after the teacher's methods of instruction. The second and third studies also demonstrated that classwide peer tutoring was causally related to increased student mastery on Friday tests. Here, direct observation data (Stanley & Greenwood, 1981) demonstrated that during peer tutoring, student academic behavior (i.e., writing and academic talk) were increased over baseline levels. The use of paper/pencil and worksheet materials used for writing and correcting tutored items showed similar increases. Also, the number of weeks that students used tutoring, in which high mastery levels and content coverage occurred, covaried with gains in pretest-posttest standardized achievement.

Two subsequent studies employed experimental control group designs to compare outcome effects for inner city LD students and produced similar outcomes. These students received reading instruction using (a) classwide peer tutoring at school, (b) parent tutoring at home, and (c) the regular school program. A fourth group, normative (non-LD) students, was also included to provide a social comparison with respect to the magnitude of LD treatment gains (Kazdin, 1977). The first study (reported in Greenwood, Delquadri, & Hall, 1984) involved 64 students in the four groups. Results after 3 months indicated that oral reading error rates for students in both tutoring programs (school and home) were significantly reduced compared to each group's preassessment levels and in relationship to both the LD control group and the non-LD normative group. Observational data indicated that students spent more time using readers and engaged in oral and silent reading behavior than did any of the other groups.

The next study (Delquadri, Elliott, Hughes, & Hall, 1983) involved 65 third to sixth grade students, 11 teachers, 13 parents, and 9 district school consultants. While identical in design to the prior study, this study employed school consultants, using prepared materials, as trainers of the classroom teachers and parents. Correct and error reading rates significantly improved for the classwide and home-parent tutoring groups. New findings indicated that teacher's ratings of student's reading comprehension were significantly higher for the tutoring groups. Teacher, parent, and student survey data also indicated a high degree of satisfaction with the tutoring procedures and the effects upon reading performance.

Otis-Wilborn (1984) implemented the program with hearing impaired students during reading instruction. She compared (a) naturalistic teacher methods (baseline); (b) classwide tutoring; and (c) two methods of sustained silent reading on direct assessments of student passage reading, comprehension, and story retelling. Students increased their oral reading practice (behavior) and their measures of oral reading rate, comprehension, and story retelling during the peer tutoring. Whorton, Locke, Delquadri, and Hall (1984) recently demonstrated the effectiveness of tutoring in a self-contained autism classroom by using regular students as peer tutors. Autistic students were taught oral reading, expressive language, and money skill activities. Walker, Nosker, Whorton, Delquadri, and Hall (1984) demonstrated that an autistic child could be trained, using a seven step shaping procedure, to provide effective tutoring for other autistic children.

Other investigators have also reported positive effects using classwide peer tutoring. Maheady and Harper (1985) implemented the classwide program in spelling with 70 third and fourth graders. Results indicated average gains of 12 percentage points on student's tests when tutoring was used. Furthermore, 80% of the students received A grades on their spelling tests, while only 4% failed. Social validity data indicated teachers and students found the program effective and acceptable. Cook, Heron, and Heward (1983) reported successful use of classwide peer-tutoring methods when used for learning sight words and math facts. Nielson, Buechin, Slaughter, and Westling (1984) used classwide peer- and parent-tutoring procedures with a variety of special

education and mainstreamed children served by a special education cooperative. They reported that the procedures were successful in increasing academic performance, enabling many children to continue in regular programs.

FUTURE WORK AND CONCLUSIONS

The classwide peer-tutoring model suggests the following points and future work. The concept of opportunity to respond can add important information concerning the assessment, placement, and instruction of exceptional children. Research examining the classroom/environmental contexts associated with school failure and low rates of academic responding will contribute to a much needed technology for least restrictive education (Arreaga-Mayer & Greenwood, in press; Bailey & Greenwood, 1985; Thurlow, Ysseldyke, Graden, & Algozzine, 1984). For example, the time in which children are engaged in specific instructional activities associated with their individualized education program will provide needed data for determining optimally effective procedures for special children. There is also a need to determine which teaching activities represented in basal reading/spelling/math texts and directed at instructional objectives actually contribute to the overall acquisition of designated outcome skills. Similar assessment approaches to early childhood intervention programs are currently needed and constitute another important area (Carta & Greenwood, 1985).

Peer tutoring serves as only one approach for increasing classwide student response opportunity. Special educators are currently expanding and adapting these procedures. One adaptation is the use of totally peer-mediated procedures for teaching and managing reading instruction (Elliott et al., 1984). In another, Rotholz (1984) and Whorton et al. (1984) have begun to experiment with the effects of group instructional procedures, in contrast to the much relied upon one-to-one model, for autistic children. Kohler and Greenwood (1985) are examining dimensions of tutors' repetoires that are particularly effective with lowest functioning tutees. Work is also being considered at the kindergarten level focused on assessing and enhancing the response opportunity of inner-city, minority-group students at risk for early special education referral and placement

(Dorsey et al., 1985). Variations on classwide tutoring procedures that can be successfully implemented with these students may reduce the probability of later special education placement.

Lastly, program developers must consider the ease of implementing procedures by the teacher, if programs like peer tutoring are to be successfully used in the school environment. The question becomes one of how to devise programs that do not add to but help the teacher's workload. Classwide peer tutoring appears to meet this criterion as do the other methods discussed in this issue. Developing other needed and useful instructional strategies remains an important future research goal.

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