
STUDENT OUTCOMES IN CO-TAUGHT SECONDARY ENGLISH CLASSES: HOW CAN WE IMPROVE?

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Co-teaching is a frequently suggested service delivery model for meeting the needs of students with learning disabilities (LD) in an inclusive environment. However, there is currently little empirical research to support these suggestions. In this study, general and special educators at one secondary site taught ninth-grade English in four different conditions (co-teaching, mainstreaming, general education students only, and special education students only). The academic outcomes in reading and writing assessments for students with LD in the co-taught settings were compared to other conditions. Results of the study indicate that teachers who report to be co-teaching may be lacking the components cited in the literature as critical to the success of this endeavor—common planning, parity, and the use of varied instructional models. No significant differences were found between the conditions. Implications of this study and suggestions for future research are provided.

Without question, the last decade has brought about a fundamental change in the role of the special educator. Students with disabilities are increasingly being served within the general education classroom, with the special educator acting as a consultant or collaborator with the general education teacher to meet the needs of these students (Mastropieri & Scruggs, 2000). Special education professionals have developed models for collaboration in order to provide support for classroom teachers and describe the process in which teachers can engage and interact with students (Bauwens & Hourcade, 1991; Cook & Friend, 1995). Co-teaching with general education teachers in the classroom is one of the ways often proposed in which special

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and general educators can collaborate to meet those needs (Bauwens & Hourcade, 1991; Cook & Friend, 1995; Murawski, 2005). In fact, according to the National Center for Educational Restructuring and Inclusion (1995), schools use a form of co-teaching more often than any other approach to implement their inclusion programs.

However, while co-teaching is frequently cited as a viable option for effectively facilitating inclusive education, there is still much confusion as to what constitutes "co-teaching." In addition, limited empirical research exists indicating its influence on student outcomes.

NEEDED RESEARCH IN CO-TEACHING

Cook and Friend (1995) define co-teaching as occurring when "two or more professionals jointly deliver substantive instruction to a diverse, or blended, group of students in a single physical space" (p. 1). However, "despite the growing popularity of collaborative instruction, the research base for such an endeavor is virtually nonexistent" (Boudah, Schumaker, & Deshler, 1997, p. 294). Gerber and Popp (1999) agree, stating that "despite a wealth of literature on collaborative teaching, little empirical data exist about this model" (p. 288). There are certainly many factors that make experimental research into co-teaching a difficult endeavor, including factors such as the nature and severity of the disabilities involved (Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998), the difficulty of conducting random selection in school-based settings (Murawski, 2003; Self, Benning, Marston, & Magnusson, 1991), and the effects of teacher quality on academic and social outcomes (Vaughn, Elbaum, Schumm, & Hughes, 1998). Despite these obstacles, Gerber (1995) asserts that "the only reasonable criterion for judging the correctness of a model... is to search for evidence that it follows from a rational calculation of its advantage and that, indeed, it produces desired academic outcomes for students in a given school better than available alternatives would or could" (p. 187). To do this appropriately, well-conducted research is required.

Walsh and Snyder (1993) sum up the need for student outcomes with any type of intervention research: "the question which ultimately must be answered regarding any proposed instructional change within today's classroom relates to academic outcomes for all students within the classroom" (p. 6). Numerous authors have cited the need for empirical evidence on the impact of co-teaching on student performance (Dettmer, Dyck, & Thurston, 1999; Gerber & Popp, 1999; Murawski & Swanson, 2001). Also well established is the obvious need to determine research-based best practices for literacy improvement.

The mixed results (scant though they are) on academic measures demonstrate a strong need for additional research in the area of co-teaching as a service delivery model (Murawski & Swanson, 2001; Weiss & Brigham, 2000). Academic achievement scores on standardized measures, as well as teacher measures such as grades, need to be collected for both co-teaching situations and comparison classes of mainstream, general, and special education classes.

Access to the general curriculum and the opportunities for increased instructional options are two frequently cited rationales for co-teaching arrangements (Bauwens & Hourcade, 1997; Cook & Friend, 1995; Dieker, 2001; Murawski, 2002b). Observing the actions of teachers who participate in co-teaching relationships will help researchers conclude if co-teaching does indeed result in a variety of instructional techniques and individualized flexibility, which in turn lead to improved student outcomes. In addition, the observation of teacher actions during co-taught classes will help to answer Zigmond and Baker's (1995) question of whether "specially" designed instruction can, or does, occur during collaboratively taught classes for students with learning disabilities.

PURPOSES OF THE STUDY

The purposes of this study were (1) to expand the research base on the service delivery model of co-teaching to students with learning disabilities at the secondary level by examining the effects of general and special education co-teaching teams on student outcome measures related to the academics provided in an English classroom, as compared to traditional models of instruction (i.e., mainstreaming, special resource classes), as well as (2) to document the actions of the collaborating teachers in these situations.

METHODS

Setting

Research was conducted at an urban high school outside of Los Angeles. The comprehensive high school has a population of approximately 2340 students in grades nine through twelve, with 105 faculty members, five administrators, and a support staff of 52. The ethnic composition of the students closely resembles the community at large: 53% Anglo, 38% Latino, 7% Asian/Pacific Islander, and 2% African-American. Only about 10% of the students are English Language Learners (ELL), which is well below the county average.

The school offers advanced placement and honors classes, as well as resource and special day classes for students in special education. Although special educators and special education paraprofessionals have provided in-class support for many years in general education classes, true co-teaching has only occurred in a limited capacity with one or two teachers.

Participants

Participants were ninth grade students enrolled in an English class. General education students ($n = 72$) were identified as students without a labeled disability or current IEP (Individualized Education Program). General education students were randomly placed in English classes by the computer system. Special education students were school-identified as having a learning disability (LD) ($n = 38$). Learning disabilities at this school are identified through a discrepancy between ability and achievement as determined by the IEP team.

Four teachers ($n = 4$) were involved in the study: three male ninth-grade general education English teachers and one female special education teacher. All participating teachers possessed a valid teaching credential in their particular area of expertise. All teachers had more than three years of teaching experience; none of the teachers had co-taught previously, although special education support had been provided in the past through collaboration and consultation. Each teacher selected was considered a “good” teacher in the school. Pseudonyms were used to protect teachers’ anonymity.

Two of the three general education teachers (Mr. Smith and Mr. Jones) taught two class periods of heterogeneous groups of special education and general education students. One of these class periods was designated as the co-teaching condition and the other class period was designated the mainstreaming condition. The special education teacher, “Ms. Gonzalez,” did not provide in-class services for the special education students during the mainstreaming class period. Students were expected to be able to meet the class expectations on their own, with any supports being provided in a resource setting later in the day. On the other hand, during the co-teaching condition, the special education teacher worked in conjunction with the general education teacher on a daily basis in the English class. Thus, although Mr. Smith and Mr. Jones each taught two inclusive classes, Ms. Gonzalez only attended one of the classes with each general education colleague to co-teach.

One general education teacher (“Mr. Brown”) was assigned a class of general education students only, with no students with identified

learning disabilities (general education condition). There was no special education assistance in any form for that condition. Finally, (Ms. Gonzalez) also taught a resource English course for students with identified disabilities (special education condition). Students in the resource English class followed grade-level curriculum, but the content was modified in both process (the way it was taught) and product (what was expected of students based on individual abilities). All students in the resource English class were special education students who were taking this course as their required English class toward graduation.

Students with LD had been identified the previous year (in conjunction with IEP teams) as to whether they would be in resource English classes (with only other students with disabilities) or served in general education English classes. At that time, the decisions were made based on student ability and student/family preference; there was no discussion at that time of this study or of whether the students would be served through mainstreaming, co-teaching, or other collaborative methods. In the past, most students with disabilities in general education classes were served through indirect assistance (e.g., a study skills class), paraprofessional assistance, or intermittent in-class support. Co-teaching was not the norm. Because students had already been identified for general education or the resource class, random placement in the general education conditions (mainstreaming or co-teaching) was able to occur for those who were going to be in general education classes.

Procedures

After obtaining administrative approval, the author met with ninth-grade special education and English teachers. These teachers were asked to participate in the voluntary study and, after agreeing, were randomly assigned to the conditions.

Participating faculty received two three-hour training sessions on the characteristics and essentials for successful co-teaching, which were conducted by the researcher (who teaches graduate courses on collaboration and co-teaching). Training also included methods of data collection that were pertinent to the study.

Prior to the beginning of the school year, a randomized block design was used to place general education students and students with LD. Blocking was used due to the need for students with disabilities in three of the four settings; randomization was done once those variables were in place. Despite the fact that every attempt was made to have teachers participating in the co-teaching arrangement ($n = 3$) to

have the same planning period times, scheduling simply did not permit this to occur. In addition, the teachers all used the same general curriculum and standards for the ninth grade; however, each teacher emphasized different aspects of the curriculum per his or her teaching style and preferences. All English classes worked on writing and read various stories during the time observed.

Pre-tests were administered at the beginning of the ten-week quarter, and post-tests were administered at the end. There were on average ten observations per class. During each observation, the researcher noted the instruction presented, the activities being conducted, and the interactions between faculty and students using an adapted version of Boudah, Shumaker, and Deshler's (1997) table of instructional activities. A second observer trained in the observation techniques also observed each situation for a total of four times (40% of the time) to determine inter-observer agreement (IOA). Treatment integrity was maintained through teacher logs, interviews, and classroom observations.

Dependent and Independent Measures

There were four levels to the variable "teaching arrangement," which was used as the independent measure: co-teaching, mainstreaming, general education only, and special education only. Each condition was operationally defined. Student "achievement" was measured through the use of both standardized (Test of Written Language-III [TOWL-3], Test of Reading Comprehension-III [TORC-3], Wide Range Achievement Test-Revised [WRAT-R]) and nonstandardized (report card grades) assessments. Student "aptitude" was measured through the use of a nationally standardized aptitude measure (Ravens Matrices Test) for the students in these participating classes.

RESEARCH DESIGN

A pretest-post-test group design was used. Although it is frequently difficult to conduct randomization in research conducted in school settings, randomized block designs were possible in this study. A two-level hierarchical model was used to analyze the results (Singer, 1998). Student performance was analyzed as a function of treatment (level one) within the context of teacher effects (level two). Because four teachers participated in this study, some overlap in teacher effects in treatment conditions was expected. Two covariates were used for level one: pre-test scores and Raven Matrices scores. The three conditions compared within the LD group were co-teaching,

special education only, and mainstreaming. The three conditions compared within the NLD group were co-teaching, general education only, and mainstreaming.

SAS PROC MIXED was the program selected for analysis, as it is considered “a flexible program suited for fitting multilevel models, hierarchical linear models, and individual growth models” (Singer, 1998, p. 323). PROC MIXED was suitable for analyzing a multilevel school effects model, which allowed the researcher to look at data on individuals nested within a hierarchy, such as students within classes.

Five types of standardized outcome measures were administered to all participants at the beginning and end of the ten-week study. Pre- and post-testing on ninth grade English students included measures of spelling (WRAT Spelling), reading comprehension (TORC Paragraph Reading), vocabulary (TOWL vocabulary), writing (TOWL spontaneous writing; subtests 6, 7, and 8), and as a control measure, mathematics (WRAT Math).

Pre- and post-test data were collected on student grades (end of the second quarter, in comparison to the end of the first quarter). Teachers and selected students were interviewed for their perceptions of the various conditions. Analyses of teacher actions and the use of co-teaching models were conducted based on observational data.

RESULTS

The results of this study are organized into three sections. The first section compares the LD and NLD groups on demographic and psychometric variables. The second section compares the treatment conditions on various dependent measures within each ability group. The third section reports information on treatment integrity (fidelity to which the treatment was administered) in terms of teacher actions.

Sample Characteristics

Table 1 displays the frequency and percentages of participants in terms of gender, age, grade, and existence of a school-identified learning disability. Treatment groups did not differ significantly in the proportion of female and male participants, $\chi^2(3, N = 101) = 4.12$, $p > .05$.

However, treatment groups did differ significantly in aptitude (IQ), as measured by the Raven Aptitude Test, $F(3, 97) = 4.28$, $p = 0.007$. A Tukey post-hoc comparison test found that comparisons between the general education only treatment condition with the mainstreaming treatment condition and the special education only treatment

Table 1. Frequency of participant gender, age, grade, and LD status

Variable	Frequency	Percentage
Gender		
Female	39	38.61
Male	62	61.39
Age		
13	12	11.88
14	74	73.27
15	15	14.85
Grade		
9	96	95.05
10	5	4.95
LD Status		
School-identified LD	34	33.66
Non-learning disabled	67	66.34

conditions were significant at the 0.05 level. As expected, students in the special education only class had the lowest overall average raw score on the Raven ($M = 38.14$, $SD = 8.11$), while those in the general education only class had the highest average scores ($M = 46.50$, $SD = 5.42$). Students in the co-teaching and mainstreaming courses were in the middle ($M = 42.84$, $SD = 6.58$ and $M = 44.21$, $SD = 6.65$, respectively). In addition, when analyzed by ability level and aptitude, students with learning disabilities averaged significantly lower than their nondisabled peers, $F(1, 99) = 51.95$, $p < .0001$. Thus, aptitude was used as a covariate in all subsequent analyses.

Treatment Comparisons

Multilevel Modeling

The pre-test and post-test means for each treatment condition as a function of ability group are displayed in Table 2. Also included are the least square means on post-test scores adjusted for pre-test and Raven Progressive Matrices test scores. A two-level hierarchical model was used to analyze the results (see Singer, 1998). For simplicity, the effects of level two (teacher effects) were not reported unless the student performance was significant at level one (treatment effects). The alpha was set at .001 for all univariates, based on a Bonferroni per comparison (.05/28). If the ANCOVA was significant, a Tukey post hoc comparison test was used.

As shown in Table 2, a variety of standardized outcome measures were administered to all participants at the beginning and end of the

Table 2. Pre-test, post-test, and least square mean scores for all standardized dependent measures by teaching condition and ability

Teaching condition	N	Pre-test		Post-test		LSM
		M	SD	M	SD	
WRAT Spelling, LD						
Co-teaching	12	30.17	4.53	31.83	4.91	34.27
Mainstreaming	8	33.63	6.84	28.63	4.93	28.56
Special education only	14	34.57	3.74	29.79	3.53	29.64
WRAT Spelling, NLD						
Co-teaching	25	37.48	4.64	37.96	4.35	37.84
Mainstreaming	26	36.85	5.18	36.46	3.86	36.66
General education only	16	37.88	3.88	37.38	4.76	36.98
WRAT Math, LD						
Co-teaching	12	34.00	2.95	36.08	3.94	32.00
Mainstreaming	8	31.38	4.57	35.25	4.33	35.51
Special education only	14	26.43	3.92	34.64	2.92	34.82
WRAT Math, NLD						
Co-teaching	25	39.56	4.22	40.24	4.16	39.98
Mainstreaming	26	38.08	3.42	38.92	4.53	40.00
General education only	16	40.69	3.07	41.13	3.61	39.95
TOWL Vocabulary, LD						
Co-teaching	12	13.75	4.09	15.08	4.54	14.74
Mainstreaming	8	13.25	3.88	16.63	4.34	16.29
Special education only	14	11.43	3.92	12.71	3.24	13.56
TOWL Vocabulary, NLD						
Co-teaching	25	17.20	5.39	20.48	4.29	20.54
Mainstreaming	26	15.96	4.94	18.88	3.55	19.72
General education only	16	19.63	4.08	22.50	3.10	21.19
TORC Reading comprehension, LD						
Co-teaching	12	9.92	5.47	12.75	5.67	12.84
Mainstreaming	8	14.38	5.21	13.88	8.46	11.16
Special education only	14	10.14	5.19	12.71	7.61	13.50
TORC Reading comprehension, NLD						
Co-teaching	25	17.08	8.85	20.52	8.12	20.28
Mainstreaming	26	14.54	7.41	17.69	7.37	17.97
General education only	16	17.50	7.92	20.25	7.44	19.92
TOWL Spontaneous writing, LD*						
Co-teaching	12	25.08	6.54	21.83	6.03	20.76
Mainstreaming	4	21.00	4.97	23.25	6.85	21.69
Special education only	14	21.36	7.47	20.36	9.67	21.63
TOWL Spontaneous writing, NLD*						
Co-teaching	25	36.92	10.49	36.36	8.33	35.84
Mainstreaming	12	30.25	12.87	39.83	10.62	43.62
General education only	16	38.44	7.77	37.56	6.90	35.96

*Combined subtests 6–8.

Table 3. Class grades by ability group

Condition	Ten-week*			Twenty-week*	
	N	M	Letter grade	M	Letter grade
General education (NLD)	16	9.25	B+/A-	7.69	B-/B
Special education (LD)	14	5.64	C/C+	6.36	C+/B-
Mainstreaming	34	5.56	C/C+	5.68	C/C+
LD	8	4.25	C-/C	3.38	D+/C-
Non-LD	26	5.96	C/C+	6.35	C+/B-
Co-teaching	37	6.89	C+/B-	6.84	C+/B-
LD	12	4.75	C-/C	4.92	C-/C
Non-LD	25	7.61	B-/B	7.75	B-/B

*Note: 0 = F, 1 = D-, 2 = D, 3 = D+, 4 = C-, 5 = C, 6 = C+, 7 = B-, 8 = B, 9 = B+, 10 = A-, 11 = A, 12 = A+.

ten-week study. After computing the F-ratio for each treatment comparison within ability groups, no significant treatment effects emerged that met the .001 level within ability groups. Therefore, no post-hoc analyses were computed. In summary, the multilevel analysis across an array of dependent measures shows no significant differences as a function of treatment within ability groups.

Descriptive Analyses/Class Grades

Table 3 displays the class grade averages by condition for the ten- and twenty-week grading periods, during which time the study was conducted. Although no statistical test was done, students in the general education only condition dropped their overall grade averages (e.g., from B+ to B-), while students in the special education only condition increased overall (e.g., from C to C+). Students in both the mainstreaming (C average) and co-teaching (C+ average) conditions remained relatively constant.

When broken down by ability group, however, it is easier to see the differences for students with LD in the various conditions. Table 3 shows that students in the co-teaching condition maintained about the same overall grade averages (C-average), whereas those students with LD in the mainstreaming condition decreased in their overall average grades (from C- to D+). Students without LD increased in grade averages in the mainstreaming condition (from C to C+) and remained basically the same in the co-teaching condition (B-average).

Instructional Activities

Treatment integrity was assessed through the direct observation of each class involved in the study. The primary investigator and a nonbiased second observer took anecdotal notes while scoring the

instructional activities. Initial results from the interobserver sessions indicated percentages of agreement between 55–100 percent. Following a discussion and comparison of anecdotal notes, observers were able to utilize an observation code table to obtain 100 percent agreement on all observations. The results of the observations, displayed in Table 4, are disaggregated by both teacher and teaching condition.

In summary, there were considerable differences between teachers in the varying conditions, as well as between those observed in the same conditions (i.e., the two teachers in co-teaching and mainstreaming). Individual teacher results are also displayed in Table 4. It is of interest to note some of these differences, such as the 13.5% of time spent on presenting content by Mr. Smith compared to the 5.5% spent by Mr. Jones. On the other hand, Mr. Jones spent 13.5% of his time individualizing instruction, whereas Mr. Smith spent no time in that area. Thus, the averaging of scores for these two teachers for the mainstreaming and co-teaching conditions—despite the fact that Ms. Gonzalez co-taught with both teachers—represents the melding of two very different patterns. The significance of these differences will be discussed.

DISCUSSION AND IMPLICATIONS

In response to the increasing desire to include students with disabilities in the least restrictive environment, frequently considered the general education classroom, educators have created a variety of ways in which to accomplish this end. One of these ways is through the use of co-teaching between general and special education teachers in an inclusive environment. The purpose of this study was to determine if the use of this service delivery option as a technique for working with students with learning disabilities in an inclusive setting resulted in significant student outcome differences in achievement in the areas of standardized test scores and grades when compared across other teaching conditions (i.e., mainstreaming, general and/or special education only classes), specifically in the area of reading and writing. In addition, differences in the instructional activities utilized by teachers in the co-teaching conditions were compared to other common teaching arrangements. Student and teacher perceptions in the varying conditions were also considered.

Gerber (1995) reasoned that the only reasonable criterion for judging the effectiveness of a service delivery model is the outcomes for the students involved. In this case, the use of co-teaching as a valid service delivery model was not found to provide statistically significant differences in student outcomes in the various academic areas

Table 4. Percentage of time teachers spent on instructional activities

	Presenting content	Mediating student learning	Facilitating transitions	Non-instructional time	Moderating student activity	Circulating	Managing behavior	Individualizing instruction
Overall results	12	19.5	13	31.5	10	8	1	5
By condition								
General education	37	21	14	22	1	2	2	1
Special education	19	23	12	23	9	7	3.5	3.5
Mainstreaming	10	18	18.5	22	11.5	8	3	9
Co-teaching, general education teachers	9.5	23	12.5	32.5	13	4.5	0	5
Co-teaching, special education teacher	2.5	18	6.5	46.5	7	14.5	0	5
By teacher								
Teacher A (Mr. Smith)	13.5	16.5	19	25	21	5	0	0
Teacher B (Mr. Jones)	5.5	25	11	32	3	7	3	13.5
Teacher C (Mr. Brown)	37	21	14	22	1	2	2	1
Teacher X (Mr. Gonzalez)	19	23	12	23	9	7	3.5	3.5

compared to the other service delivery models used. When standardized tests were controlled for the pre-test measures and the results of the Raven Aptitude Test, students in the co-teaching condition did not fare any better than those in the other conditions. However, this is not the whole picture.

Although none of the statistical analyses resulted in observable differences, a look at the pre- and post-score differences (displayed in Table 2) demonstrates that for the spelling and reading comprehension subtests (areas frequently of concern for students with learning disabilities), students with LD in the co-teaching condition did fare better than their LD counterparts in other conditions. On the math and vocabulary subtests, all students with learning disabilities improved from their pre-test scores regardless of condition. On the other hand, students with LD in the co-teaching condition produced lower post-test scores on the TOWL spontaneous writing subtests compared to the other students with LD. The unevenness of these results leads one to speculate that the rationale behind those changes may not lie solely with the service delivery model provided. The impact of each individual instructor, whether in a co-taught situation or not, also appears to be a factor. Indeed, the need for further research efforts in this area certainly continues.

Reading and writing are key components of a secondary English class. However, unlike the elementary grades in which these skills are taught, faculty at the high school level typically assume these skills to be in place. Educators and parents are often faced with the conundrum of determining the least restrictive environment for individuals whose reading and writing disabilities are significantly below their grade level. When in a co-taught environment, it is theoretically possible that while the general educator is ensuring the lessons are content-driven and standards-based, the special educator is ensuring that explicit and direct instruction on reading and writing skills are infused into the lesson where appropriate. These could be done using approaches such as alternative teaching or station teaching, described by Cook and Friend (1995). In this study, however, it was not apparent that any direct instruction in reading or writing skills were being taught to students with or without disabilities.

In terms of grades, students in the co-teaching condition did not produce significantly different outcomes than those in the other conditions. Upon reflection of the grade averages, it is clear that students in the general education only condition have the overall highest grade point averages. Nevertheless, whereas the NLD students in the general education only class decreased in their overall grade averages between the grading periods, students with LD in the special

education only condition increased their overall averages, and students (NLD and LD combined) in the mainstreaming and co-teaching conditions established very little difference in grades between grading periods. Upon further examination, it is evident that students with LD in the mainstreaming condition dropped in their overall averages. In comparison, students with LD in the co-teaching condition increased their overall averages slightly. From this, readers might infer that while standardized test scores might not have increased for students in the co-teaching service delivery model, their grades demonstrate that they are improving—or at least not decreasing—in grades as their LD counterparts in the mainstreaming condition did.

One of the primary reasons to engage in co-teaching is that it can offer the opportunity for instructional options, as well as enhance instructional intensity and continuity (Friend & Cook, 2000). Using both teachers in varied instructional techniques while working toward a common goal is another important aspect of co-teaching (Hughes & Murawski, 2001; Smith & Harris, 1999) that may differentiate it from other models. The results of this study, however, do not appear to support the hypothesis that teachers in the co-taught setting use an array of instructional techniques different than their peers in the other settings.

In an effort to assess treatment integrity, teachers were observed and their actions documented. It is through this documentation that a pattern appeared. Much as Zigmond and Baker (1995) feared, there does not appear to be much “specially” designed instruction for students with learning disabilities. In all four conditions, both segregated and inclusive in nature, teachers spent the vast majority of the time using a large-group format. Even in the special education only resource class, very little individualizing of instruction was observed.

Although the special education teacher interacted with students during the co-teaching conditions, very little difference between the mainstreaming and co-taught classes was observed in the way of curriculum, instruction, behavior management, or assessment between conditions. The agenda, content, and method of instruction (lecture, small group work, and individual work) did not vary much between conditions. The primary difference between co-teaching and mainstreaming conditions was that having two teachers available allowed one (usually the special educator) to circulate and help with questions or assignments. The predominant role of the special educator appeared to be that of assistant to the general education teacher—even in the class in which much more parity in instruction was observed. The special education teacher spent much more time circulating during the co-teaching condition than any of the other teachers did.

A disturbing percentage of time in all conditions is spent on non-instructional time (see Table 4). This is especially evident in the co-teaching condition, in which the general education teachers spent approximately 32.5% and the special education teacher spent 46.5% of time on activities that did not involve the students (usually grading). It was apparent during observations that teachers wanted to use the “extra free time” they had while the other teacher was responsible for instructing or monitoring the class. For co-teaching to be a viable service option, teachers need to be interacting and actively engaged with *all* students.

Some differences did appear between the classes in which students were homogeneous and those that were inclusive in nature. For example, more time was spent presenting content in a lecture format for those homogeneous classes (special education only and general education only), whereas the heterogeneous classes spent more time than the others in moderating student activities. This variation of instruction can be seen as a benefit, especially for students who have learning styles that are not primarily auditory in nature. Another positive note is that virtually no time was spent in the co-teaching conditions on directly having to manage student behavior.

Based on the observations conducted, it can be concluded that very little collaborative co-teaching occurred during this study; these co-teachers appear to be stuck at the beginning stage of co-teaching (Gately & Gately, 2001). However, it is important to note that what did occur in the classrooms is considered a valid example of what is occurring nationally in classes in which co-teaching is said to be taking place. Common complaints by special educators include feeling like an instructional assistant, not having much input in curricular planning, not being able to effectively modify or individualize instruction for students in the general education class, and not knowing how to successfully interact with the general education teacher during classtime. If many co-teaching situations mirror those observed in this study, and it is suspected that they do, it is understandable that both general and special education teachers feel frustrated with this relationship. It is also understandable that differences in student outcomes are difficult to obtain; for this to occur, something different would need to occur in the classroom as a result of this service delivery model. Currently, that doesn't appear to be happening. Thus, the overwhelming need for additional training, implementation, evaluation, and improvement of the co-teaching model is apparent. It is also clear that the issues facing secondary content instructors may be different from those of co-teachers at the elementary level (Dieker & Murawski, 2003; Murawski & Dieker, 2004).

The author interviewed a sample of students in all four conditions. While a variety of responses were given to the varying questions, certain themes or patterns did appear: different teachers contribute to different co-teaching dynamics; students value having two teachers in “difficult” classes; courses that are currently co-taught are not differing in instructional techniques from the other conditions; and special education students prefer to be in general education classes with support. In summary, student interviews in this study support what has been reported elsewhere.

In reviewing the interviews conducted with teachers, four themes emerged:

1. teachers enjoy having another teacher in the room
2. very little co-planning for curriculum or instruction was conducted
3. the quality of discussions and student activities improved in co-taught classes
4. relationships develop over time.

Thus, results of the interviews with the teachers involved in the inclusive classrooms both support and refute the literature.

Limitations of the Study

Duration of Study

In order to gain permission to perform this study, an attempt was made to minimize the disruption to the class setting. Permission was granted for one quarter of instruction (ten weeks). Because standardized testing was used to assess student outcomes, a longer time frame would have produced more valid results. This limitation reflects that of the study by Boudah, Schumaker, and Deshler (1997).

Sample Size

This study was confined to one high school with one group of students and four teachers. Thus, using parametric statistics with such small sample might impact the generalizability of the findings. Conducting a similar study in multiple secondary schools with more teachers and students would increase the reliability of the results.

Teaching Styles

While conducting this study in a regular high school (and not in an analog or contrived setting) assists in the generality of its findings, the very nature of co-teaching relies heavily on the personalities

and classroom environments created by each teacher involved. This was evident in the dynamics between the teachers, despite the two training sessions that were conducted concomitantly. The subsequent actions of the general education teachers working with the special education teacher during the school quarter were very different. Although these differences certainly act as a limitation in regard to research comparisons and a generality of findings, they also emphasize the very reason that many specialists in education have not done this type of research in this particular area (Murawski, 2003): the success of true co-teaching depends heavily on the personalities and abilities of the teachers involved.

Standardized Tests

The standardized tests utilized in this study were selected based on their availability, ease of use, adequacy of reliability and validity data, and the ability to provide them to a group at the secondary level. If studies on co-teaching are conducted and analyzed at the individual level or for students in elementary grades, other tests might be more appropriate or provide a higher degree of reliability and/or validity data. Due to the fact that they are standardized, these tests also do not adequately reflect the improvement made in regard to the actual curriculum taught as a curriculum-based measurement (CBM) would. In addition, as stated previously, a longer time frame between testing periods is suggested.

Future Research

Weiss and Brigham (2000) found six major problems within the current research on collaborative teaching. These problems were addressed in this study in the following manners:

1. vital information on the measures used in this study was provided
2. to avoid potential bias, a school was used in which co-teaching was not already in use as the predominant service delivery model
3. while teachers' personalities were found to play a substantial role in the activities of co-teaching pairs, the success of the program was judged by student outcomes, not merely by teacher opinion
4. the general and special education teachers were given the same definitions of co-teaching during training given to all participants

5. outcomes are stated quantitatively as well as qualitatively
6. the actions of the general and special education teachers were observed and documented during the process of co-teaching.

Although these particular problems were addressed in this study, it is recommended that future studies consider the problems cited by Weiss and Brigham (2000) and continue to make concerted efforts to avoid those difficulties.

A stated limitation of this study is its duration. Future studies of co-teaching should consider the need for time to develop co-teaching relationships, especially when overall student outcomes are to be measured. Other studies should lengthen the time of the study to include entire school years; perhaps a longitudinal study with a pair of co-teachers who work with the same students over multiple years (most likely at the elementary level) would be useful.

The need for training and ongoing feedback cannot be stressed enough. Although the teachers in this study were provided with limited training prior to the beginning of the research collection, it was apparent that more training was needed. Collaboration is a complex process that requires ongoing feedback and communication. This would also enable researchers to more accurately gauge the true outcomes for students when teachers are engaged in co-teaching as it is defined in the literature. Teacher preparation programs can help by including general and special teacher candidates into inclusive programs and modeling co-teaching at the university level (Murawski, 2002a).

Another area for focus is the potential difference between having willing volunteers who participate in co-teaching relationships versus participants who are told by the administration that they will be co-teaching. Villa, Thousand, Nevin, and Malgeri (1996) indicate that teachers may frequently have to collaborate as a matter of course, and that an emergent characteristic of this forced collaboration is that they recognize the benefits and ultimately are supportive of the process. It would be noteworthy to document the potential differences and effects between these two situations.

Finally, though standardized tests provide a method of measuring student outcomes, it would be a mistake to solely rely on the outcomes of formal tests when assessing co-teaching outcomes for students, especially in the area of language arts or English. It is necessary to utilize more curriculum-based assessments in order to determine if students with learning disabilities are more successful in learning the material taught in their general education classrooms as a direct result of the service delivery model offered. In the area of reading and writing

instruction, a valid measure of student achievement would be to compare actual samples of student work in writing and audiotapes of student decoding and/or comprehension responses in a pre-post format before and after co-taught instruction.

Educational Implications

Co-teaching between general and special education faculty continues to be an approach frequently selected to implement the inclusive programs offered through schools. As such, it is clear that a need for quality research in this area exists. This study addressed both qualitative and quantitative questions related to the area of co-teaching. Both teachers and students assert that there are definite benefits to having two teachers work collaboratively in one classroom. These findings will make it easier to encourage more teachers to engage in co-teaching partnerships in the future.

The results of this study also clearly imply that teachers need to be trained in how to co-teach effectively and efficiently. Administrators, university faculty, and others involved in teacher preparation cannot assume that teachers will be able to enter a co-teaching relationship, however willingly, and significantly change their teaching styles to maximize the co-teaching potential. As with any new teaching technique, ongoing staff development is mandatory for co-teaching to be successful. A truly enlightened training for English or language arts teachers would be training that was co-presented by an expert on reading/writing instruction and an expert on co-teaching/collaboration. This would ensure that general and special education teachers working in English instruction would glean best practices in both the content of reading and writing instruction as well as the pedagogy necessary to make it effective for students in an inclusive classroom.

The ultimate goal for any service delivery model is to benefit students. Reading and writing are key elements for the educational success of all students; special and general educators need to work together in the co-taught classroom to ensure that all students are benefiting from this collaboration. Clearly, more research is needed in the area of co-teaching, and schools would benefit by availing themselves to researchers who are interested in pursuing this avenue of inquiry. The schools themselves can benefit by the research conducted, the training offered, and the feedback presented, while the researchers will be able to collect the data necessary to inform others of the impact co-teaching may have. Without such collaboration between schools, teachers, and researchers, however, students with and without learning disabilities will continue to be served by a

variety of techniques that have yet to be research-proven as effective methods of service delivery.

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