Academic Achievement of Secondary Students with Learning Disabilities in Co-Taught and Resource Rooms

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Abstract

Although coteaching has become a widespread instructional option for students with disabilities, there are concerns regarding its effectiveness on student achievement especially at the secondary level. The authors examined whether ninth grade students with learning disabilities (LD) who received instruction in a resource classroom achieved at a comparable level to students with LD who received instruction in a cotaught general education classroom. The findings indicate that the students with LD in the resource classroom achieved at a better level than did those students who received their instruction in the cotaught classroom. Implications and suggestions for further research are discussed.

In response to providing a more inclusive education for students with disabilities, coteaching has become increasingly popular as an instructional service delivery option (Friend & Bursuck, 2009; Kloo & Zigmond, 2008; Magiera & Zigmond, 2005; Rea & Connell, 2005; Scruggs, Mastropieri, & McDuffie, 2007). Friend and Cook (2007) defined coteaching as "two or more professionals jointly deliver[ing] substantive instruction to a diverse, blended group of students in a single physical space" (p. 113). Vaughn, Bos, and Schumm (2007) stated that the "roles and responsibilities of each teacher are decided ahead of time…[and] vary according to the goals of the lessons and the needs of the students" (p. 43). When this service delivery model is implemented, both general education and special education teachers are expected to share positive interdependence. That is, these professionals contribute equally to the teaching responsibilities for all students in the classroom (Friend, Reising & Cook, 1993; Vaughn et al. 2007, Villa, Thousand & Nevin, 2004) to provide optimal educational benefits for all students in the cotaught class (Cook & Friend, 1995).

Traditionally, special education teachers taught in isolation with little emphasis on subject specific, content information. Prior to the 1970s, students with disabilities in the public schools were segregated from their general education peers and often were viewed as the educational responsibility of special education personnel only (Kavale & Forness, 2000; Ripley, 1997). The general education practice of team teaching, that is two teachers sharing responsibilities for planning and instruction in the same classroom, provided the roots for coteaching (Friend et al., 1993; Reinhiller, 1996). With the passage of Pub. L. 94-142 in 1975, educators sought to find an instructional model that would allow more students with disabilities to be served in the least restrictive environment (LRE). The Individuals with Disabilities Education Act (IDEA) Amendments of 1997 included the importance of access to the general education curriculum for

students with disabilities (Mageria & Zigmond, 2005; Yell, 2006), while the IDEA 2004 mandated access to a highly qualified teacher for students with disabilities (Yell, 2006). Both the IDEA 2004 and the No Child Left Behind Act of 2001 (NCLB) mandate that students with disabilities receive instruction in the same general curriculum as students without disabilities (Yell, 2006). Likewise, these laws require stronger accountability for student achievement (Latham, Latham, & Mandlawitz, 2008; Osborne & Russo, 2006; Yell, 2006), including the requirement that students with disabilities make adequate yearly progress (AYP) as measured by grade level standardized assessments (IDEA Regulations, 34 C.F.R. § 300.157; Kloo & Zigmond, 2008; Murawski & Dieker, 2004; Yell, 2006). According to Wood (2006), coteaching is an "effective way to promote inclusion and LRE" (p. 22). In response, coteaching has become a widespread instructional option for students with disabilities (Dieker & Murawski, 2003; Friend & Cook, 2007; Scruggs et al., 2007; Weiss, 2004; Zigmond, 2006).

Rationale for Coteaching

Although team teaching had been employed in general education classrooms from the 1960s through current times, only recently has that model been employed in collaborative classes including students in special education. As various models of coteaching evolved, Cook and Friend (1995) developed guidelines for creating effective practices that continue to provide the basis of coteaching strategies that currently are found in educational settings. According to Cook and Friend, the rationales for using the coteaching model included: (a) "increase[d] instructional options for all students," (b) improve[d] program intensity and continuity," (c) "reduce[d] stigma for students with special needs," and (d) "increase[d] support for teachers and related service specialists" (p. 3). Three additional rationales for coteaching have their roots in the IDEA and the NCLB Acts: (a) coteaching is a means of placing students with disabilities in the LRE (Kloo & Zigmond, 2008; Wood, 2006), (b) coteaching provides students with disabilities access to the general education curriculum (Kloo & Zigmond; Rice & Zigmond, 2000; Rice, Drame, Owens, & Frattura, 2007; Zigmond, 2006), and (c) coteaching provides a highly qualified teacher for students with disabilities (Anonymous, 2006; Friend & Cook, 2007; Hardman, Rosenberg, & Sindelar, 2005; Kloo & Zigmond, 2008; Murawski & Dieker, 2004; Villa et al., 2004; Zigmond, 2006). This latter reason for employing the coteaching model is of particular importance when a special education teacher is not certified in a specific content area.

Components of Coteaching

Embedded within Cook and Friend's (1995) rationales for coteaching are four key components: (a) general educators and special educators work together, (b) both educators deliver "substantive instruction," (c) these educators mostly are in the same physical space, and (d) they teach a heterogeneous group of students that includes students with and without disabilities. Other authors (Dieker & Murawski, 2003; McDuffie, Landrum, & Gelman, 2008; Murawski & Swanson, 2001; Ripley, 1997; Walther-Thomas, 1997) have concurred with Cook and Friend's essential components and have included additional elements they believe are germane to effective coteaching programs. Some of these components include: (a) joint planning time (Dieker, 2001; Dieker, n.d.; Fennick, 2001; Friend et al., 1993; Keefe & Moore, 2004; Ripley, 1997; Villa et al., 2004; Walther-Thomas, 1997), (b) joint responsibility for the success of the program and students (Murawski & Swanson, 2001; Rice et al., 2007; Vaughn et al., 2007; Villa

et al., 2004; Walther-Thomas, 1997; Wood, 2006), (c) joint confidence and trust in each educator's abilities (Cozart, Cudahy, ndunda, & VanSickle, 2003; Keefe & Moore, 2004; Mastropieri et al., 2005; Villa et al., 2004; Walther-Thomas, 1997), (d) a positive climate (Dieker, 2001), and (e) assessment procedures that are designed to evaluate the effectiveness of the instruction delivered to the students (Dieker, 2001; Dieker, n.d.; Dieker & Murawski, 2003; Murawski & Dieker, 2004; Walther-Thomas, 1997).

Of all the essential components included within the coteaching concept, two appear to have gained the most attention of researchers and have been deemed critical for a successful coteaching experience. Those factors are common planning time and compatibility of the personalities of the coteachers (Friend et al., 1993; Mastropieri et al., 2005; Scruggs et al., 2007; Villa et al., 2004; Weiss & Brigham, 2000). Common planning time allows teachers the opportunity to work together to determine the instructional strategies that will be used in the classroom setting and the instructional role each teacher will assume during each class period. Ripley (1997) and Rice and Zigmond (2000) noted that successful coteaching does not occur unless all of those persons involved in the process are committed to the planning, implementation, and the ultimate success of the coteaching process.

Compatibility of personality types helps educators trust each other's professionalism and expertise so that meaningful communication can take place (Villa et al., 2004). Once the coteachers have established mutual respect and trust, they then can discuss and openly manage their coteaching program thereby establishing a positive learning climate. In her research, Dieker (2001) found that the development of a positive learning climate was the most common practice observed in a cotaught classroom.

As coteachers gain confidence in their ability to work with each other, complementary teaching and team teaching appear to be the preferred coteaching model or strategy by the majority of educators (Villa et al., 2004). As Cook and Friend (1995) noted, many experienced coteachers have found that they use several coteaching models throughout the academic year, and even within a single lesson. Their choice depends upon the nature of the instructional content, the specific needs of individual students, and the preferences of the two teachers. According to Cook and Friend, Friend and Bursuck (2009), and Villa et al. (2004), one coteaching instructional model cannot be deemed superior to others or appropriate for all educational settings. They suggested that teachers should use the model that is appropriate for their setting based upon their students' instructional needs, age, maturity, the physical environment, and the nature of the content matter being taught. "At the core of co-teaching is determining what instructional techniques will be most efficient and effective in helping all students meet those standards" (Murawski & Dieker, 2004, p. 55).

Coteaching and the Secondary Classroom

Coteaching as a means of giving students with disabilities access to the general education curriculum and instruction by a highly qualified teacher is more prevalent at the elementary and

middle school levels than in high schools (Friend et al., 1993; Zigmond & Magiera, 2001). Coteaching in the secondary classroom presents several challenges (Dieker & Murawski, 2003; Keefe & Moore, 2004; Mastropieri & Scruggs, 2001; Mastropieri & Scruggs, 2007; Rice & Zigmond, 2000). One challenge is the nature of secondary education and the emphasis on subject specific content knowledge (Dieker, 2001; Keefe & Moore, 2004; Keefe, Moore, & Duff, 2004; Magiera, Smith, Zigmond, & Gebauer, 2005; Mastropieri & Scruggs, 2001; Rice & Zigmond, 2000; Rice et al., 2007; Zigmond, 2006). In addition, many special educators are required to coteach across several content areas, preventing them from acquiring the requisite subject area expertise (Dieker, n.d.). Since most special education teacher preparation programs focus on differentiated teaching strategies and adaptations rather than content knowledge in a specific subject area, the special educator's role in the cotaught classroom may be limited to an educational consultant or teaching assistant (Dieker, 2001; Friend & Cook, 2007; Magiera et al., 2005; Morocco & Aguilar, 2002; Rice & Zigmond, 2000; Scruggs et al., 2007; Weiss & Lloyd, 2002) rather than that of a co-teacher (Keefe & Moore, 2004; Keefe et al., 2004; "Researcher: High School Co-Teaching," 2004). When teachers do not view themselves as equal peers, the mutual trust and respect required for successful coteaching is negated and the coteaching process is jeopardized. Likewise, these discrepancies between the secondary general educator's and special educator's preparation programs and their content knowledge and pedagogical skills pose potential areas of stress between secondary coteachers.

A second challenge tends to be administratively-based. It stems from the type of support that school administrators provide educators who are involved in the coteaching process. Often, coteachers are assigned schedules that do not allow for an appropriate amount of planning time with each other or requisite knowledge of the coteaching process. Further, teachers often indicate a lack of knowledge about the coteaching process because neither their preservice training nor current teaching experiences prepared them for coteaching (Villa et al., 2004).

A third challenge occurs because the academic performance gap that exists between students with and without disabilities becomes more pronounced at the secondary level (Dieker, n.d.; Dieker & Murawski, 2003; Smith, 1997; Weiss & Lloyd, 2002). Because of the pressures and expectations of the NCLB Act and its mandated achievement of AYP for all schools, an expectation exists that students with disabilities can and should achieve at a level comparable to students without disabilities. This expectation has created a challenge especially for secondary school personnel because there is a significant achievement gap between students with and without disabilities that increases at the secondary level (Mastropieri & Scruggs, 2001; National Center for Educational Statistics, 2007; Zigmond, 2006). Students with disabilities frequently come to the high school with insufficient academic knowledge, poor learning skills, and a sense of failure. This becomes especially challenging for general and special education teachers since students with disabilities are expected to perform at a level comparable to students without disabilities on standardized measures of achievement (Dieker & Murawski, 2003; Murawski & Dieker, 2004; NCLB, 2001; Vaughn et al., 2007). Furthermore, in many states the results of standardized assessments or other performance assessments are determining factors for high school graduation (Mastropieri & Scruggs, 2001; Mastropieri et al., 2005). These factors contribute to many secondary teachers' beliefs that the poor performance of some students with disabilities will reflect negatively on them and their teaching abilities (Mastropieri et al., 2005). As a result, many secondary teachers are reluctant to engage in the coteaching experience and are

inclined to be less positive toward educational inclusion than their counterparts at the elementary or middle school levels (Dieker, 2001; Mastropieri & Scruggs, 2001; Murawski & Dieker, 2004).

Efficacy of Coteaching as an Instructional Practice

Coteaching has been promoted as an instructional model that is "likely to increase the outcomes for all students in the general education setting" (Murawski & Dieker, 2004, p. 52) as well as to improve academic performance outcomes and possibly alleviate the achievement gap for students with disabilities, yet Mastropieri and Scruggs (2001) wrote that a "major challenge is the relative scarcity of research on inclusive secondary classrooms compared with inclusive elementary classrooms" (p. 265). Others (Boudah, Schumaker, & Deshler, 1997; Dieker, 2001; Friend & Hurley-Chamberlain, 2006; McDuffie et al., 2008; Murawski & Swanson, 2001; Scruggs et al., 2007; Weiss, 2004; Zigmond, 2001) also have expressed concern about the research base supporting the academic effectiveness of coteaching. Dieker (n.d.) stated that "despite the increasing popularity of this service delivery model, the field currently lacks a strong empirical database on the overall effectiveness of this model" (Introduction section, para. 1).

The majority of research on coteaching at the secondary level has focused primarily on teachers' perspectives of coteaching (Friend & Hurley-Chamberlain, 2006; Mastropieri et al., 2005; Mastropieri & Scruggs, 2001; Rice & Zigmond, 2000; Rice et al., 2007; Weiss, 2004; Zigmond, 2001). Other research has focused on effectiveness as measured in terms of teacher relationships, teaching strategies, student attitudes, and social implications for general education students and students with disabilities who are in cotaught classrooms (Rice & Zigmond, 2000; Smelter, Rasch, & Yudewitz, 1994; Walther-Thomas, 1997; Weiss & Lloyd, 2002; Wilcox & Wigle, 1997).

Although there is a great deal of discussion on the appropriateness of particular models of service delivery among educational leaders, policy-makers, and advocates for individuals with disabilities, there continues to be limited qualitative and quantitative research on the coteaching service delivery model and its impact on student achievement in secondary classrooms (Mastropieri & Scruggs, 2001; Murawski, 2006; Rice & Zigmond, 2000). Therefore, more research that focuses specifically on the effects of coteaching on students' with disabilities academic achievement at the secondary level is needed (Dieker & Murawski, 2003; Murawski, 2006; Murawski & Swanson, 2001; Rice & Zigmond, 2000).

Method

The purpose of this study was to examine whether ninth grade students with learning disabilities (LD) who received instruction in a cotaught class achieved at a level comparable to their peers who received instruction in a resource classroom. Coteaching has been used for the past 6 years as the prevailing instructional model for core academic areas for the majority of students with disabilities at the school.

Teachers in the cotaught classes were interviewed to determine that they actually used instructional techniques characteristic of a cotaught class and that their teaching practices were

consistent with the literature (Dieker, n.d.; Friend & Cook, 2007). Their participation in professional, district-wide learning sessions that focused on coteaching also was validated. It was determined that the teachers involved in this study implemented a majority of the following essential coteaching practices:

1. Both coteachers delivered a substantive amount of instruction in the classroom (Cook & Friend, 1995).
2. Both teachers were knowledgeable of and utilized the coteaching strategies of parallel teaching and alternative teaching, which are at the higher end of the hierarchy of coteaching practice (Villa et al., 2004).
3. Both coteachers were provided with and took advantage of common planning time and collaborated with each other for a minimum of 1 day a week to a maximum of 3 to 5 days a week (Fennick, 2001; Friend et al., 1993; Ripley, 1997; Villa et al., 2004).

Design

This study used a pretest/posttest design comparing students with LD in cotaught and resource classrooms over a 12 week period. The dependent measures were pre and posttest scores on 40 questions taken from the End of Course Tests (EOCT) for a ninth grade literature course. The study was a nonrandomized sample because students already were enrolled in these existing classes. Students were provided with the testing accommodations as required by their individualized education programs (IEPs).

Population and Sample

The study was conducted in a high school of 2,285 students in a metropolitan area of a southern state. Of the 132 students enrolled in ninth grade literature, 28 had IEPs. The participants in the study were a sample of 14 students (9 males, 5 females) with LD, ages 14-16 years (M = 15.04, SD = .87), who were enrolled in a ninth grade Literature course (see Table 1). The participating students were assigned to either the cotaught or the resource class based on the recommendations of their IEPs. Ten of the students were White and four were Black. Five students (36%) qualified for free or reduced-price lunch. IQ scores were measured by the Wechsler Intelligence Scale for Children, Third or Fourth editions, and the Stanford-Binet Intelligence Scales. Participants' IQ scores ranged from 57 to 113 (M = 87.54, SD = 15.45; see Tables 2 and 3). Results of an independent t-test showed no significant differences between the two groups on the verbal ($t(10) = 2.014$, $p = .072$), performance ($t(10) = 1.335$, $p = .212$), or full scale ($t(11) = 2.188$, $p = .051$) IQ scores (see Table 4). Achievement test scores were measured by the Wechsler Individual Achievement Test, the Woodcock-Johnson Tests of Achievement, or the Kaufman Test of Educational Achievement (see Tables 2 and 3). Results of an independent t-test on the WIAT showed no significant differences between the two groups on reading comprehension ($t(11) = 0.494$, $p = .635$) or written expression $t(11) = 0.403$, $p = .704$; see Table 4).

Measures

The research instrument for data collection was the state's 2004 EOCT. The EOCT instrument was selected because it is a measure used by the state's Department of Education to evaluate the

level of understanding of the content and standards of the subjects taught in the classes involved in this study. The validity of the EOCT was determined primarily through content validation (C. Domaleski, personal communication, January 25, 2007). The reliability coefficient for Literature was .94. Each test contained an average of 75 sample questions. Subject area teachers chose 40 questions that were to be covered during the semester of the study. The same tests and procedures were used for both the pre and posttests.

Results

The study took place in ninth grade Literature. The data collected from the EOCT based pretests and posttests were analyzed to establish the achievement levels for the two groups of students with LD. A comparison of the pretest scores between the types of class using the Levene Statistic as a test of homogeneity of variance demonstrated no significant differences in ninth grade literature. An analysis of co-variance (ANCOVA) was applied to the independent variable (type of delivery), the dependent variable (mean posttest scores), and the covariate (mean pretest scores) to determine if there were significant differences among the treatment groups.

Based on the ANCOVA, no statistical significance was found between the mean scores of students with LD in ninth grade Literature. The mean of the students with LD in the resource classroom was higher when compared to students with LD in the cotaught literature class. The results of the ANCOVA using the written test as covariate did not show a statistical significance in ninth grade literature ($F(2, 4) = 2.101$, $p = .238$, $\eta^2 = .512$), but the eta square suggests a moderate influence on the outcome. Comparing the gain score using an ANCOVA with the full scale IQ as covariate ($F(2, 10) = 2.648$, $p = .119$, $\eta^2 = .346$) suggested that there is no significant difference, but the eta square at .346 suggests a low moderate influence on the outcome.

Discussion

Access to the general education curriculum, instruction by a highly qualified teacher for all students in the school setting and the improved academic achievement of all students are critical components of the IDEA 2004 and the NCLB Act of 2001. With the passage of the IDEA 2004 and the NCLB Act, coteaching has become a widespread instructional option for students with disabilities allowing them access to the general education curriculum in the general education classroom. However, many researchers (Dieker, n.d.; Friend & Hurley-Chamberlain, 2006; Mastropieri & Scruggs, 2001; Weiss, 2004) have cited concerns regarding the academic effectiveness of coteaching on student achievement especially at the secondary level and the lack of a strong empirical database on the overall effectiveness of this model. This study examined the effectiveness of coteaching on the academic achievement of ninth grade students with LD to determine whether those students who received instruction in a cotaught general education class achieved at a level comparable to those students who received their instruction in a resource special education classroom.

When the achievement of students with LD in cotaught classrooms was compared to the students with LD in resource rooms, the students in the resource class scored higher on the EOCTs in ninth grade Literature. Although there was no significant difference, it appears that the students with LD in the resource rooms made greater gains on the EOCT than did their counterparts in the

cotaught classrooms. It appears that the cotaught setting did not positively impact the achievement of students with LD, which is not consistent with the assertions of the proponents of coteaching (Murawski, 2006; Murawski & Dieker, 2004; Rice & Zigmond, 2000; Zigmond & Mageria, 2001). Based on the findings of this study, it would appear that students with LD who are assigned to a resource classroom because they lacked appropriate academic skills benefit from the more individualized instruction than could be provided in a large cotaught classroom. However, care must be taken when attempting to generalize the results due to the small sample size.

Limitations

Several limitations, other than the small sample size, are inherent in this study. The study was conducted using a quasi experimental design and a nonrandomized sample; therefore there was not the same level of control that would be found had a true experimental design been used. Critical to the study was the use of best coteaching practices found in the literature by the coteaching pairs assigned to the various content classes. Although teachers were interviewed to ensure their knowledge of coteaching characteristics, methodologies, and previous training, no actual measures of the coteaching strategies and interactions used by coteachers during the duration of the study were analyzed. In addition, students usually are not motivated to do their best on tests that appear to carry no weight on their grades, specifically the EOCTs. To counteract this limitation, teachers were authorized to offer an incentive to students, such as using the pretest and posttest scores to replace one or more test grades if those scores were higher than an existing test grade.

Implications for Practice

If students with LD are making greater gains in resource classrooms, than the rush to educate 90% of the students with disabilities more than 80% of the time in the general education classroom (Georgia Department of Education, 2008) may be misguided. While it is true that many, if not most, students with mild disabilities can succeed academically in cotaught general education classrooms, schools should not totally abandon the special education resource room model. IEP teams need to carefully consider the nature of the classroom, the specific content knowledge required, and which students with LD can succeed in the general education classroom. Students should be educated in resource or general education classrooms according to their academic needs and strengths, not according to state or federally established benchmarks. If the performance gap is one that can not be compensated for in a cotaught classroom, then IEP teams should consider whether the intensive remedial instruction should take place in a resource room instead. Students with LD may need to be taught in resource rooms until they are capable of achieving at a commensurate level as their peers without learning disabilities.

Schools also should recognize the value for students with LD in cotaught classrooms when schools give teachers planning time to ensure that coteaching can take place as it is intended to be implemented. If not, schools have to question the wisdom of having two teachers teach collaboratively.

Recommendations

Further investigations should focus upon the collection of longitudinal data, thereby satisfying Murawski's (2006) recommendation for "a longer time frame between testing periods" (p. 243). Collecting data at the beginning of the course and at the end of the course would establish a common starting point for all groups and more accurately assess academic gains for students with and without disabilities assigned to coteaching and general education settings. This process would provide school personnel with more reliable data regarding the effectiveness of the coteaching model at the secondary level and satisfy the recommendation of Rosman (1994) for collection of data over a longer period of time.

In the current study, students were assigned to the various classes based upon IEP information. Students with disabilities in small group settings (e.g., resource rooms) usually are assigned to these settings because of greater difficulty with achievement than their peers who are taught in general education settings. Therefore, future research needs to control for the severity of disability. Schools also should investigate the instructional characteristics of the resource classroom, specifically the alignment to standards of the core content taught in the resource classroom and the manner of assigning special educators to cotaught and resource classrooms. In addition, future research should examine whether the results of this study are true for students with other disabilities. Last, the study should be replicated with actual measures of the coteaching strategies and interactions used by coteachers, controlling for other variables in addition to fidelity of instruction, like years of experience teaching.

Overall, schools should continue to investigate the academic effectiveness of the coteaching instructional delivery system for students with and without disabilities. Although the results of this study indicate that students with LD were more successfully academically in resource classrooms, there are many questions that must be answered.

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Table 1
Demographics of Ninth Grade Student Participants

	Gender	Age	Ethnicity	SES	Level of Special Ed.	Grade Placed in Special Ed
1	M	15-5	B	Yes	cotaught	3
2	M	14-5	B	Yes	resource	5
3	M	14-1	W	Yes	resource	3
4	M	14-5	B	Yes	cotaught	5
5	M	14-1	W	No	cotaught	1
6	F	15-1	B	No	resource	4
7	F	14-2	W	No	cotaught	3
8	M	15-0	W	No	cotaught	5
9	M	14-11	W	Yes	resource	3
10	M	15-4	W	No	resource	4
11	F	14-0	W	No	cotaught	3
12	M	14-7	W	No	cotaught	4
13	F	15-8	W	No	cotaught	K
14	F	16-5	W	No	cotaught	2

Notes. Ethnicity: B = Black, W = White; SES: Yes = Free/Reduced Lunch;
N/A = Not Available

Table 2
IQ and Achievement Scores

	IQ	Overall Academic Achievement	Specific Academic Achievement
1	N/A	Broad Reason = 54[d] Broad Math = 61 Broad W-L = 61	
2	V = 77[a] P = 94 FS = 76		Numerical Operations = 79[e] Math Reasoning = 74 Written Expression = 75
3	V = 90[b] P = 87 FS = 87	Reading = 73[e] Math = 97	
4	V = 93[b] P = 100 FS = 96		Basic Reading = 72[e] Reading Comprehension = 66 Math Calculation = 87 Listening Comprehension = 108 Written Expression = 71
5	V = 82[b] P = 95 FS = 87		Reading = 84[e] Math Calculation = 110 Math Reasoning = 99
6	V = 78[b] P = 62 FS = 68		Basic Reading = 91[e] Reading Comprehension = 80 Math Reasoning = 66 Spelling = 94 Numerical Operations = 75 Written Expression = 69
7	V = 95[b] P = 98 FS = 96		Basic Reading = 86[e] Math Reasoning = 99 Reading Comprehension = 80 Numerical Operations = 97
8	V = 95[b] P = 87 FS = 87		Basic Reading = 87[e] Math Reasoning = 87 Reading Comprehension = 74 Numerical Operations = 76 Written Expression = 76
9	V = 61[a] P = 73 FS = 57		Letter Word Identification = 89[d] Passage Comprehension = 80 Reading Fluency = 76 Writing Sample = 79 Calculation = 69 Applied Problems = 84
10	V = 95[b] P = 103 FS = 98	Reading = 72[f] Math = 79 Battery = 73	

11	V = 117[b] P = 107 FS = 113		Numerical Operations = 85[e] Math Reasoning = 100 Word Reasoning = 86 Written Expression = 99 Reading Comprehension = 86
12	V = 90[b] P = 97 FS = 83		Listening Comprehension = 94[e] Oral Comprehension = 94 Reading Comprehension = 80 Math Reasoning = 83 Written Expression = 73
13	V = 88[b] P = 68 FS = 76		Letter Word Identification = 78[d] Passage Comprehension = 76 Calculation = 93 Applied Problems = 77
14	Verbal Reason = 93[c] Abstract Reason = 118 FS = 104		Written Expression = 62[e] Math Applications = 104 Reading Decoding = 83 Spelling = 75 Reading Comprehension = 97 Math Computation = 92

Notes. N/A = Not Available

Notes. a = WISC-IV, b = WISC-III, c = Stanford-Binet, d = Woodcock Johnson, e = WIAT-II, f = KTEA

Table 3
Descriptive by Test by Group

Test	Group	N	Mean	Standard deviation
IQ	Co-Taught	8	94.00	11.78
	Resource Room	5	77.20	15.99
VIQ	Co-Taught	7	94.29	11.01
	Resource Room	5	80.20	13.21
PIQ	Co-Taught	7	94.86	12.42
	Resource Room	5	83.80	16.39
Rdg Comp	Co-Taught	6	80.50	10.54
	Resource Room	4	83.75	9.60
Written	Co-Taught	5	76.20	13.77
	Resource Room	2	72.00	4.24
Pretest	Co-Taught	9	19.33	7.89
	Resource Room	9	13.60	4.03
Post Test	Co-Taught	9	17.67	7.79
	Resource Room	9	16.60	4.66

Table 4
Differences Between Co-taught and Resource Room on Test Taken

Test	Instruction	t	df	Sig (2-tailed)
IQ (FS)	Co-Taught	2.188	11	.051
	Resource Room			
VIQ	Co-Taught	2.014	10	.072
	Resource Room			
PIQ	Co-Taught	1.335	10	.212
	Resource Room			
RDG Comp	Co-Taught	.494	8	.635
	Resource Room			
Written	Co-Taught	.403	5	.704
	Resource Room			
Pretest Score	Co-Taught	1.50	12	.159
	Resource Room			
Post Test Score	Co-Taught	.277	12	.787
	Resource Room			
Gain Score	Co-Taught	1.615	12	.132
	Resource Room			