

Co-Teaching vs. Solo Teaching: Comparative Effects on Fifth Graders' Math Achievement

Melissa Witcher

Jay Feng

May 2010

Presented at the Mid-South Educational Research Association Annual Conference. Nov. 3-4, 2010. Mobile, Alabama.

Abstract:

Current educational reform in K-12 schools in this nation is much driven by the No Child Left Behind Act. One central goal of NCLB is to “bring all students (including special education children) up to grade level in reading and math, to close the achievement gap and to hold schools accountable for results”(ed.gov). Varied innovative efforts are being undertaken by school systems to ensure they meet the NCLB mandate, and one such instructional strategy is co-teaching (McDuffie, Mastropieri, & Scruggs, 2009). Co-teaching may have different names such as team teaching, parallel teaching, alternative teaching, or collaborative teaching, but the essential is having two qualified teachers in the classroom working together to plan, teach, and assess students learning (Dieker & Murawski, 2003,; Bouck 2007). But research on effects of co-teaching in elementary schools is emerging and inconclusive (Dugan & Letterman, 2008). The purpose of this action research project was to compare the effects of co-teaching vs. solo teaching on students’ academic achievement in the elementary school, specifically this research focused the comparative effects on fifth graders’ math achievement. Participants of this study were the students of two fifth grade math classes in one elementary school, one with a regular education teacher (solo-teaching) and the other with the same regular education teacher and a special education teacher (co-teaching). Participants’ math achievement as measured by both standardized and non-standardized tests including Unit tests, 120 Day test, CRCT, and ITBS) was analyzed for comparison. A series of unpaired t-tests was conducted comparing the various math scores of students in the two classes, solo teaching and co-teaching. No statistical significant difference was found, but noticeable differences in 9 out the 10 sets of math scores did seem to favor co-teaching. Results of the study indicate that co-teaching appears to have more positive effect on students’ achievement in elementary schools. Due to limitations of this study (intact classes, no random selection of subjects, small sample size, teacher as researcher), further research is needed.

Introduction

The field of education seems to have the constant motion as a pendulum. Through the back and forth moment innovative strategies are tried, tested and implemented in the classroom. Once the strategies implemented are deemed successful, they are adopted and built on to improve the learning environment for the students. National, state and local educators and administrators are working hard to develop the best learning opportunities for all students. In an effort to unify the learning of all students, standards based curriculum is being implemented across the nation. Unifying expectations of what students are to learn is a great idea.

The process of producing a better education for all students is currently driven much by the No Child Left Behind Act of 2001. No Child Left Behind (NCLB) was established to provide each student with equal quality education (ED.gov). U.S. Department of Education reports in 2007 that "NCLB is working to bring all students up to grade level in reading and math, to close the achievement gap and to hold schools accountable for results" (ED.gov). These "results show across-the-board improvement" (ED.gov). The push for better math scores has motivated schools to implement various forms of interventions. The desire to produce an equal quality of education for all students, extends to special education students also. Least restrictive learning environment is the goal for all

special education students. With this goal in place many of the “special education” students are returning to the general education classroom.

Educators have researched students for many years. Through studies it has been found that students learn in different ways. Howard Gardner introduced the Multiple Intelligences theory, suggesting that students excel through different learning environments (Christodoulou, 2009). This concept of multiple learning styles suggests education has to take different paths. To help meet the needs of the diverse learners, educators are eager to implement strategies that will best benefit the students. With expectations for all learners to reach a central goal, diverse paths may be taken to achieve it.

One path that is being introduced in various school systems is co-teaching. Co-teaching may have different names such as team teaching or collaboration. The concept with co-teaching is to have two qualified teachers in the classroom so that the students will benefit from several different viewpoints. Teachers can present the same information from different learning styles. Teacher lead small group instruction is easily implemented. Having two teachers opens more opportunities for students to receive more one-on-one instruction or assistance that they may lack in the regular general education classroom.

Statement of Research Problem

The effectiveness of co-teaching is yet to be clarified. Several studies have been conducted but with inconclusive results regarding the success or downfall of co-teaching (Dugan & Letterman, 2008). Co-teaching has been implemented in an urban school district of Atlanta, Georgia, in an attempt to improve the learning environment and success of all students. This study will investigate the comparative effects of co-teaching versus solo-teaching by analyzing the academic performance of students in the same grade level in two different classrooms at the elementary school. One class is various leveled general education students and is solo-taught. The second class is comprised of general education students along with special education students and is co-taught. The special education students have all been in a resource room for some of their core content areas. The varied abilities levels of both classes are comparable. Data collection of these students' pre and post unit tests and their current and previous CRCT math scores will be analyzed to determine the comparative effectiveness of co-teaching vs. solo-teaching.

Review of Literature

The number of studies on co-teaching is growing. The concept of co-teaching is being implemented in various school systems. An urban district of Atlanta, Georgia school system has implemented co-teaching

into their elementary schools this year in an attempt to increase student achievement in the classroom.

Co-teaching has been called different terms, some being collaboration, parallel teaching, alternative teaching and team teaching (Bouck, 2007). Emily Bouck (2007) shares that Co-teaching is described by Dieker and Murawski (2003) "as two or more teachers who are equal in status located in the classroom together, working together, and providing instruction". Co-teaching allows for teachers to work together to plan and develop lessons and activities that will best benefit the students with their various learning needs. Solo-teaching also includes this planning, developing and implementation. Co-teaching provides the opportunity for more teacher assisted learning. Co-teaching allows more opportunities for direct correction or redirection of students that need more assistance through the learning process. Special education is striving to create the least constrictive learning environment for all students. Bouck (2007) also writes "special education students are gaining access to the general education curriculum through co-taught general education classes" (p. 47). Not only do the special education students benefit, but the average general education students benefit also. Having two qualified teachers in the classroom allows for the average general education student receive more interaction with the teacher who would normally be engaged in the learning process of the struggling learners.

Co-teaching, according to Dugan and Letterman (2008), benefit students in being “exposed to the strengths of varied viewpoints”. Dugan and Letterman (2008) continue to write “students can develop critical-thinking skills by synthesizing multiple perspectives” in the co-taught classroom. Students may have multiple opportunities and experiences with the content through the difference in teaching styles of the two teachers in the co-taught classroom. Dugan and Letterman (2008, p. 14) conclude that “previous research on team teaching indicates a variety of benefits for both students (Benjamin 2000; Davis 1995; Harris and Watson 1997; Hinton and Downing 1998; Johnson et al. 200; Wilson and Martin 1998)”. They also share in their report that co-teaching is “used as a tool for integrating material from different disciplines and remedying problems” (p. 11). Dugan and Letterman (2008) added that “Helms et al. (2005) reported” students lacking in areas such as “interpersonal, oral and written” communication “may benefit from team-teaching methods as a way of addressing these problems” (p. 11).

McDuffie, Mastropieri and Scruggs (2009) write that there is an increase of co-teaching being implemented in schools. This change in education format, McDuffie, Mastropieri and Scruggs (2009) continue, is due to “the goal to meet the needs of all students” (p. 495). The teachers “co-create goals, co-instruct, collaborate on student assessment and classroom management, and jointly make decisions pertaining to their

class" (McDuffie, Mastropieri and Scruggs, 2009 (p. 495). Through their research, McDuffie, Mastropieri and Scruggs (2009) found that "students in co-taught settings statistically outperformed students in non co-taught settings" (p. 506). They go on to share that "according to several researchers (Bauwens & Hourcade, 1995; Cook & Friend, 1995; Vaughn et al., 1997; Walther-Thomas, 1997), co-taught classes reduced student-teacher ratios which in turn increases the opportunity for teacher interaction with students" (p. 507). McDuffie et al. (2009) continue to share that Walther-Thomas has reported "students in co-taught classes received more teacher time, attention, and assistance than in non-co-taught classes" (p. 507).

Co-teaching allows for several models of teaching to take place. In parallel teaching, a type of co-teaching, both teachers are teaching the same information to different groups of students within the classroom. In team teaching, teachers are working together and equally to deliver content to the whole class (McDuffie, Mastropieri and Scruggs, 2009). Furthermore, one lead and one assist is when one teacher is leading the majority of the class while the other teacher works with a small group or individual on other needs. Co-teaching allows various models of delivering content to students as well as more individualized assistance for students who demand it.

“Collaboration is increasingly identified as a key aspect in teachers' professional growth” shares Jang (2006, p. 178) in his article “Research on the effects of team teaching upon two secondary school teachers”. Co-teaching is a concept of teachers collaborating together to create learning environments for students of diverse learning levels, abilities and styles. This teacher collaboration allows teachers to learn from one another and expand their understanding of diverse teaching styles and approaches. Jang's research found that “the average final exam scores of students receiving team teaching were higher than those of students receiving traditional teaching (p. 185). He also stated that “it was observed that team teaching has a positive impact on the final exam scores of the experimental groups” (p. 185). Jang further discusses that through his findings team teaching did significantly increase the scores and students shared they thought it was due to the different ways the teachers taught, allowed students of different learning styles learn the information in a way that was easier for them (p. 191).

No Child Left Behind Act along with the Individuals With Disabilities Education Improvement Act have set guidelines for education that affects the planning and development of student education. One strategy that is becoming more accepted is co-teaching. This is allowing students with learning disabilities to receive their education in the least restrictive environment that includes more assistance and guidance

through two qualified educators being in the classroom. Sileo and Garderen (2010) define co-teaching as “an instructional delivery model applicable to teaching student with disabilities in least restrictive integrated classroom settings in which general and special educators share responsibility for planning, delivering, and evaluating instructional practices for all students. The blend of general educators’ knowledge of curriculum and the supportive methods of interventions and differentiation of the special education educator allows a creation of a learning environment that not only supports the learning of the special education student but also greatly benefits the general education students. Though co-teaching may take various forms (team teaching, alternative teaching, parallel teaching, station teaching), with two educators being in the classroom, working together to prepare, present, differentiate instruction and better evaluate student progress and participation, it removes the encumber of student success from just one instructor. Sileo and Garderen’s (2010) research revealed that having two teachers allowed for students to receive more opportunities of one-on-one, small group and resourced instruction. Their concerns are “difficulty identifying research-based practices designed specifically for students with disabilities”, the appropriateness of “instructional practices” for different age groups, and “limited range of instructional strategies” in math instruction may limit “co-teaching structures” in general education settings

(Sileo & Garderen, 2010). In general, Sileo and Garderen share that co-teaching can be beneficial to all students in the general education class, by allowing multiple teachers to have interaction with students, student progress and delivery of information for better student understanding.

Sileo & Garderen (2010) focused their research on the co-taught math class. Their concerns were for effective planning, multiple strategies in math and the age appropriate effectiveness. Working in a math co-taught class I can see where their concerns may be warranted. Math is such a driven subject that teachers often teach whole group and do not use parallel teaching or stations. When parallel teaching is used students that struggle to focus during whole group instruction are given an opportunity to receive instruction in a smaller setting where their attention is more focused and less distracted by the movement of other students. Small group instruction allows for the teacher to see more directly, and in a more timely fashion, what areas the students are struggling with and give immediate feedback. Murray and a group of colleagues wrote "Effects of Peer Coaching on Teacher's Collaborative Interactions and Students' Mathematics Achievement" (2009). They echoed that co-teaching can be beneficial to all students in the co-taught classroom as long as the teachers can effectively plan and work together to create a environment of constant and supportive learning and teaching. Joanna Christodoulou (2009) writes that to further the ability to make successful

instructional strategies is to apply the multiple intelligences. Through the multiple intelligences incorporated into the curriculum and creation of instruction students may be exposed to multiple formats of the information for more opportunities to differentiate and create implement new, effective strategies for struggling students.

The concern for planning was also held by Kohler-Evans (2006). Kohler-Evans (2006) writes that the effectiveness of planning, sharing responsibility for student success and doing it in an environment that is welcoming and comfortable for the students also is crucial for co-teaching to succeed. In his book, Kohler-Evans (2006) compares the co-teaching relationship of teachers to that of a marriage. For the success to be obtained the teachers have to work well together. They need to be able to build on their individualities and strengths to create an environment that is cohesive and supportive for the students. Having the same planning time is often mentioned in the research for co-teaching to be successful. This is supported by Shapiro and Dempsey in their book "Conflict Resolution in Team Teaching" (2008). Planning time allows teachers to share their differences in strategies while reviewing curriculum to efficiently plan which students will benefit from the different areas of focus and styles of teaching. Teachers working together will make "choices based on students' needs" (Abdallah, 2009). This collaboration allows teachers to support one another, develop in depth discussion and

review of student progress and needs as well as creating an interconnected mind and plan to benefit all students. Abdallah (2009) agrees that co-teaching benefits the students through “exposure to different teaching philosophies, techniques and methods”. Stewart (2006) shares that co-teaching has the “most positive pedagogical outcomes” and teachers should “take advantage of the benefits that come from joining with other teachers in pursuit of pedagogical objectives”. Content changes through the years. When educators are not confident with their ability to teach the content or in depth understanding they cannot effectively teach students. Cavanagh (2009) exposed that many teachers obtain “shaky knowledge of math content”. Co-teaching can build opportunities for teachers to grow in their ability. Through the collaboration the teachers will develop learning opportunities for students where the best techniques and methods will be used. This will meet the needs of all learners as well as strengthen the teachers' capability to teach more effectively.

Class size is another effect on the ability for teacher instruction to be completely successful with all students. Abdallah (2009) writes that “co-teaching lowers the student-teacher ratio and exposes the students to differentiated teaching methods.” The mindset of small class versus large class is often changing and effected by testing rates, student success and the economic situation during that time in education. All class sizes may

benefit from the co-taught classroom instead of a solo taught classroom since there would be a smaller teacher to student ratio. Abdallah (2009) goes on to share that student-teacher ratio of co-teaching “supports the evidence that indicates that students who learn in small groups both retain and achieve more in the classroom.”

Sutton, Jones and White (2008) through their study of Florida's class sizes included co-teaching in their research. They found that co-teaching was “potentially effective in improving the performance of all students in a class” (Sutton et al., 2008). Having two teachers in the classroom allows for small group instruction and diverse teaching styles to be exposed to curriculum. In their article they shared that “in 1996, Winking and colleagues found that effective inclusive teaching” consisted of “special education and general education team-teaching... in a heterogeneous mix of students with developmentally appropriate instruction, authentic assessment, and parent partnership” The combination of a united support system greatly benefits the students in their learning process (Sutton et al., 2008). Florida had developed co-taught classrooms to help with financial situations. During the process and documentation they found that “co-teaching had the power to transform students and teachers alike” (Sutton et al., 2008). Sutton, Jones and White (2008) found that “collaborative teaching increased the numbers of schools that reach federally mandated Adequate Yearly Progress (AYP).” Co-teaching can “meet a

range of diverse learning needs in a classroom” and “can support meaningful participation of students with diverse learning needs in the general education classroom” (Sutton et al., 2008). Education is often being faced with financial and federal mandated AYP goals. Co-teaching can be a strategy used to effectively meet the goals needing to be met by budget and the students’ learning development that are measured by the AYP goals.

Method

Overview of the Project

This action research project was conducted to determine if co-taught and solo-teaching have different effects on the students learning by comparing the learning outcome of students in a co-taught classroom with those students in a solo-taught classroom at an elementary school. Students were taught lessons from the same plans and received the same tests with the difference of one class being co-taught and the other class being solo-taught. The classes each consisted of 20 students. The general education math teacher was the same teacher for both the co-taught class and the solo-taught class. The co-taught class had a second teacher included in the classroom. The value of the co-taught teacher is assumed to give an opportunity for more students to work in small group or with individualized assistance when needed.

Research question

Is co-teaching more effective than solo-teaching in the elementary school? Do students in the co-teaching class have better academic performance than students in the solo-teaching class?

Hypotheses

Co-taught teaching is more effective than solo-teaching in elementary school. Students in the co-taught class have a more positive learning outcome than the students in the solo-taught classroom.

Description of the Sample

This study was conducted at a rural elementary school. The school has approximately 720 students enrolled in kindergarten through fifth grade. The students of in this study were in fifth grade. Two classes were selected due to their similarities in student ability and scores. The general education teacher was approached to participate in the research since she shared the role of a solo-taught classroom and a co-taught classroom. When explained to her that data would be collected of students' scores on Unit tests, ITBS and CRCT and compare the two classroom styles, she felt that the co-taught class was comparable to one of her solo taught classes. Her recommendation of this solo-taught class was based on her previously taken grades. The grades for these two classes were comparable in ability. They were also selected for their difference of being co-taught and solo taught. The co-taught class

consisted of eighteen students with five students being labeled as “special education”. This class consisted of two teachers. The regular education teacher taught both the co-taught class and the solo taught class. This teacher is a veteran teacher of over twenty years and obtains a Masters degree. The co-taught teacher is in their first year of teaching and is obtaining their Masters degree. The overall student abilities that made up both classes were comparable.

Data Collection and Analysis

Data was collected by obtaining the tests and results of students from the two different learning environments. Math units were introduced with a pre test, standards are taught and the unit is ended with a post test. Students' scores were collected for these unit pre and post tests during the school year. Scores of the CRCT math portion were also collected of the students' data. The previous school year (2009) CRCT scores were compared to their current (2010) CRCT scores. Further data collection included a 120 Day test (120th day of school to see student progress on the standards up to that point in time) and the 2007 and 2009 ITBS math scores. None of the students were in a co-taught environment last year, since this is a new program to the school this school year. The score from the pre and post test reflected the same standards students are tested and scored on in the CRCT. The scores were compared to show growth of the student achievement.

A series of unpaired t tests were conducted respectively using SPSS, to compare the effects of co-teaching vs. solo-teaching on student achievements in unit test grades, 120 Day test grades, CRCT and ITBS math scores. Data collected on the students are presented in the tables below (table 1 and Table 2). Table 1 consists of the data collected for Group A, the co-taught class, during this research. Table 2 contains the data collection from this research for Group B the solo-taught class.

Table 1: Data of students in co-taught class

Group A	Unit 1 Pre	Unit 1 Post	Unit 2 Pre	Unit 2 Post	Unit 3 Pre	Unit 3 Post	120 Day Test	CRCT '08	CRCT '09	ITBS '07	ITBS '09
a-1					12/48%	10/40%	14/35%	753	757	1.9	3.9
a-2	19/95%	15/75%	15/51.7%	20/69%	16/64%	21/84%	27/67.5%	865	871		8.4
a-3	13/65%	9/45%	14/48.3%	14/48.3%	8/32%	7/28%	33/82.5%	855	808	2.8	5
a-4	17/85%	14/70%	20/69%	22/75.9%	13/52%	21/84%	13/32.5%	990	901	6.8	9.5
a-5	13/65%				9/36%	15/60%	17/42.5%	877	833	5.1	7.6
a-6	20/100%	14/70%	26/89.7%	25/86.2%	5/20%	23/92%	31/77.5%	913	912	5.8	10
a-7	19/95%	9/45%	17/58.6%	26/89.7%	10/40%	20/80%	21/67.5%	891	887	5.2	7.7
a-8	12/60%	5/25%	11/37.9%	18/62.1%	6/24%	10/40%	10/25%	772	800	3.6	5.3
a-9	11/55%	8/40%	15/51.7%	21/72.4%	7/28%	16/64%	16/40%	826	823	4.2	5.4

Table 2: Scores of the solo taught class

Group B	Unit 1 Pre	Unit 1 Post	Unit 2 Pre	Unit 2 Post	Unit 3 Pre	Unit 3 Post	120 Day Test	CRCT '08	CRCT '09	ITBS '07	ITBS '09
b-1	11/55%	11/55%	17/58.6%	22/75.9%	7/28%	18/72%	28/70%	817	813	3.2	4.4
b-2	11/55%	12/60%	11/37.9%	22/75.9%	11/44%	12/48%	14/35%	845	884	4.2	6.1
b-3	20/100%	15/75%	22/75.9%	24/82.8%	14/56%	22/88%	33/82.5%	897	901	5.1	11
b-4	11/55%	9/45%	16/55.2%	17/58.6%	4/16%	17/68%	21/52.5%	845	830	3.2	5.4
b-5	5/25%	7/35%	4/13.8%	12/41.4%	4/16%	12/48%	16/40%	768	778	2.6	4.2
b-6	17/85%	14/70%	8/27.6%	23/79.3%	14/56%	15/60%	22/55%	823	865	3.9	7.3
b-7	14/70%	13/65%	16/55.2%	21/72.4%	9/36%	15/60%	20/50%				5.3
b-8		2/10%	3/10.3%	14/48.3%	9/36%	13/52%	34/85%	823	830	3	5.1
b-9	8/40%	6/30%	13/44.8%	12/41.4%	8/32%	12/48%	22/55%	795	810	2	4.2
b-10	11/55%	8/40%	17/48.3%	11/37.9%	6/24%	11/44%	21/52.5%	789	749	2.2	3

Table 3: Comparison results of Unit Tests

	Mean	SD	SEM	N	t value	df	P value	Co-Teaching Difference
Unit 1 Pre								
Group A	77.5	18.13	6.41	8	1.7504	15	0.1005	77.5-60=17.5
Group B	60	22.5	7.5	9				
Unit 1 Post								
Group A	52.86	18.9	7.14	7	0.04479	15	0.6606	52.86-48.5=4.36
Group B	48.5	20.28	6.41	10				
Unit 2 Pre								
Group A	58.123	16.85	6.369	7	1.6228	15	0.1256	58.123-47.76=10.363
Group B	47.76	20.654	6.531	10				
Unit 2 Post								
Group A	71.857	14.012	5.296	7	1.2959	15	8.077	71.857-61.39=10.467
Group B	61.39	17.8	5.629	10				
Unit 3 Pre								
Group A	38.22	14.3	4.77	9	0.5799	17	3.82	38.22-34.4=3.82
Group B	34.4	14.39	4.55	10				
Unit 3 Post								
Group A	63.56	23.19	7.73	9	0.5495	17	0.05898	63.56-58.8=4.76
Group B	58.8	13.86	4.38	10				
120 Day Test								
Group A	52.222	21.486	7.162	9	0.632	17	0.5358	52.222-57.750=-5.528
Group B	57.75	16.56	5.237	10				

Table 3 consists of the Unit 1, 2 and 3 pre and post tests, and the 120 Day test. Group A is the co-taught class and Group B is the solo-taught class. There was not a significant difference in the between the two groups when the T test was performed. The hypothesis is rejected when you look at the t test results, and supported when you examine the co-teaching difference. Yet, when you compared the means from Group A to Group B there was a greater value for Group A. The last column of data shows the difference of the positive influence of co-teaching over solo-teaching

with the exception to the 120 Day Test. In this case Group B had a greater value than did Group A. Students in the co-teaching environment did produce scores higher than that in the solo-taught class in nine of the ten sets of scores. Even though the co-taught scores were higher in most of the comparisons, there was not a significant difference when the t-tests were conducted. Both groups showed improvement and had similar scores, but the co-taught class scores were slightly higher than the solo-taught class. The support from the extra teacher helps to support all the students in the class.

Table 4: Comparison Results for ITBS

ITBS	Mean	SD	SEM	N	t value	df	P value	Co-Teaching Difference
2007								
Group A	4.1538	1.833	0.6482	8	1.002	14	0.3334	4.1538-3.425=0.7288
Group B	3.425	0.9331	0.3299	8				
2009								
Group A	6.978	2.154	0.718	9	1.366	17	0.1897	6.978-5.6=1.378
Group B	5.6	2.231	0.706	10				

Table 4 compares the results of the ITBS scores taken in 2007 and 2009.

Group A is the co-taught class and Group B is the solo-taught class. The last column subtracts the Group B mean from the Group A mean to show that there is a slighter higher value for Group A. This shows that the students in Group A (co-taught) benefited from having the exposure to two teachers in the classroom. The t tests did not show a significant

difference between Group A and Group B. The hypothesis is rejected when you look at the t test results, and supported when you examine the co-teaching difference. Even though there was not a significant difference in the scores, Group A (co-taught class) scores do show benefits from co-teaching over Group B (solo-teaching class).

Table 5: Comparison Results for CRCT

CRCT	Mean	SD	SEM	N	t value	df	P value	Co-Teaching Difference
2009								
Group A	843.56	52.22	17.41	9	0.6151	16	0.5471	843.56-828.89=14.67
Group B	828.89	48.89	16.30	9				

Table 5 shows a comparison of the CRCT results for 2009. Group A is the co-taught class and Group B is the solo-taught class. The table shows a slightly higher value for the co-taught class over the solo-taught class. These results neither support nor rejected. The students in both Group A and Group B during the 2009 CRCT were in solo-taught class.

These two classes consist each of 20 varied leveled learning ability students. Through the comparison of the students' abilities it shows that the students are varied in their abilities and comparable in overall aptitude. With the balance of skill represented in both classrooms the data shows support of the effectiveness of co-taught classrooms.

Results and Conclusion

Researching co-taught math class versus solo taught math class is to compare the effectiveness of co-teaching over solo teaching. This research was designed to clarify if students that were in a co-taught classroom would grow in their ability to be successful in math more than the students in the solo taught math class. Co-taught classes are becoming a strategy increased in use to create a more productive and effective learning environment for students with learning disabilities. Not only would the students with learning disabilities benefit from co-teaching, so would students of all levels.

Students in the co-taught class and the solo taught class were assessed to be comparable groups in their ability in performance for math. The general education teacher teaches in both classes. The special education teaches along with the general education teacher in the co-taught classroom. The teachers were able to have some planning together. Due to the co-teacher's schedule she was limited on the amount of common planning time with the general education teacher. The teachers worked together to plan. The co-teacher was able to assist in keeping students focused, on track of note taking, answering questions for students that would further their understanding and not stop instruction for the whole class. The ability for the teacher to have extra assistance for the students that were struggling or not engaged greatly eased the

general education teachers ability to continue teaching in an uninterrupted environment. Sutton, Jones and White (2008) found in their research that the support of the co-teacher benefited all students and even helped the schools to meet AYP. Often if there was a misconception revealed to the co-teacher that would affect other students, there was opportunity to build on those learning experiences as a whole group learning opportunity. This often benefited students that had not asked the question but were wonder or struggling with the same concept. Co-teaching allowed opportunities for the teachers to share the same curriculum using different strategies that would help the students with the different learning styles and abilities. The results show that even though the students in the co-taught classroom increased in their own ability, there was not a significant difference when compared to the solo-taught class. These two classes were considered comparable at the beginning of the school year, due to their previous grades and different levels of ability in the class. Several of the students in the co-taught classroom have been labeled as special education students that the solo taught classroom did not obtain. Through the comparison of the tests from the beginning of the school year to the end, the students of the co-taught classroom had an average score higher than that of the solo-taught classroom. This was concluded by comparing the Unit tests from Group A to Group B. When compared Group A had higher means then

Group B in all areas except for the 120 Day Test. Students of all abilities seem to improve through both classes. The students of the co-taught class greatly increased their scores that are especially clear in Table 1, ITBS '09 section. This data represents the students' ability level in math by grade level and month (ex: 5.7 would represent fifth grade, seventh month). The students' in the co-taught classroom have a greater increase in their ability level. The hypothesis is rejected from analyzing the t tests because there was no significant difference. The hypothesis was supported when the scores were compared by subtracting the means of the t tests. In this comparison Group A, the co-taught class, was greater than the scores of Group B, the solo-taught class in nine of the ten sets of scores. This slightly higher mean for Group A, the co-taught class, supports the hypothesis. Co-teaching benefits the students.

This study supports that co-taught classrooms benefit all students included in the class as supported by research conducted by Abdallah (2009). Research could be continued to include more students' scores instead of the small number of students from each class that participated in this research. Obtaining a larger number of students' scores could show a larger difference. Research could be conducted to compare the student scores of more classes. Further support of this research could be conducted where the teachers are not the researchers, such as in this research the special education teacher was also the researcher. This

research was limited by student participation, number of classes and number of teachers. Continuing to research with an enlarged group and an unbiased research would strengthen the results of the topic such as McDuffie, Mastropieri and Scruggs (2009) found that “students in co-taught settings statistically outperformed students in non co-taught settings” (p. 506).

References:

- Abdallah, J. (2009) Benefits of Co-Teaching for ESL Classrooms. *Academic Leadership* v7 no.1. Retrieved from Wilson Web ISSN:153-7812 on October 6, 2009.
- Bouck, Emily C. (2007) Co-Teaching...Not Just a Textbook Term: Implications for Practice. *Preventing School Failure* v51 no2 p46-51. (Wilson Web No. 0734901133012 Retrieved September 25, 2009)
- Cavanagh, Sean. (2009) NAEP Scores Put Spotlight on Standards. *Education Week* v29 no8 p1,12. (Wilson Web ISSN:0277-4232 Retrieved November 30, 2009)
- Christodoulou, Joanna A. (February 2009) Applying Multiple Intelligences. *School Administrator* v.66 no.2 p22-6. Retrieved November 30, 2009 from Wilson Web Accession Number 200903200771006.
- Dugan, Kimberly & Letterman, Margaret. (Winter 2008). Student Appraisals of Collaborative Teaching. *College Teaching*, v. 56 no. 1, p. 11-15. (ERIC Document)
- Jang, S. (2006, June 1). Research on the Effects of Team Teaching upon Two Secondary School Teachers. *Educational Research*, 48(2), 177-194. (ERIC Document Reproduction Service No. EJ737416) Retrieved September 10, 2009, from ERIC database.
- Kohler-Evans P. A. (2006) Co-Teaching: How to make This Marriage Work in Front of the Kids. *Education* (Chula Vista, California) v12 no.2 p260-4. Retrieved from Wilson Web ISSN: 0013-1172 on October 6, 2009.
- McDuffie, K., Mastropieri, M., & Scruggs, T. (2009, June 1). Differential Effects of Peer Tutoring in Co-Taught and Non-Co-Taught Classes: Results for Content Learning and Student-Teacher Interactions. *Exceptional Children*, 75(4), 493-510. (ERIC Document Reproduction

- Service No. EJ844208). Retrieved September 10, 2009, from ERIC database.
- Murawski, Wendy and Dieker, Lisa. (2008) 50 Ways to Keep Your Co-Teaching Strategies for Before, During and After Co-Teaching. *Teaching Exceptional Children* v40 no. 4 p40-8. Retrieved from Wilson Web ISSN:0040-0599 on October 6, 2009.
- Murray, S., et. al., Effects of Peer Coaching on Teachers' Collaborative Interactions and Students' Mathematics Achievement. *The Journal of Educational Research (Washington, D.C.)* v. 102 no. 3 (January/February 2009) p. 203-12
- Shapiro, Elayne J. and Dempsey, Carol J. (summer 2008) Conflict Resolution in Team Teaching: A Case Study in Interdisciplinary Teaching. *College Teaching* v56 no. 3 p157-162. Retrieved from Wilson Web ISSN:8756-7555 on October 6, 2009.
- Sileo, Jane M. and van Garderen, Delinda. (2010) Creating Optimal Opportunities to Learn Mathematics: Blending Co-Teaching Structures With Research-Based Practices. *Teaching Exceptional Children* v42 no.3 p14-21.
- Stewart, Paul. (2006) Team Teaching. *The American Music Teacher* v56 no.3 p4-5. Retrieved from Wilson Web ISSN: 0003-0112 on October 6, 2009.
- Sutton, L.C.; Jones, Phyllis and White, Julia. (2008) Florida's Class Size Amendment and Co-Teaching: An uneasy Partnership. *Educational Considerations* v36 no.1 p17-20. Retrieved from Wilson Web ISSN:0146-9282 on October 6, 2009.