

ABSTRACT

Patty Hardy Keene, *IMPROVING CO-TEACHING IN AN EASTERN NORTH CAROLINA DISTRICT* (Under the direction of Dr. James McDowelle). Department of Educational Leadership, October 2017.

This dissertation presents a problem of practice, small scale proof of concept focused on improving co-teaching and collaborative planning with regular and special education teachers in Hertford County, NC. The following are conclusions gained from insights developed during the project: (a) When implemented with fidelity the Co-Teaching Collaborative Planning model can be effective in classrooms in Hertford County; (b) To insure successful implementation of the model, the regular classroom teacher must relinquish control and accede to a genuine collaborative relationship, (c) The Special Educations teacher's content and curricular knowledge are enhanced through the Co-Teaching and Collaborative Planning process, and (d) Student Perceptions of the Special Education Teacher are positively changed when the Special Education Teachers becomes a fully functioning partner in a Blended Classroom.

IMPROVING CO-TEACHING THROUGH A COLLABORATIVE PLANNING PROCESS
IN AN EASTERN NORTH CAROLINA DISTRICT

A Dissertation

Presented to

The Faculty of the Department of Educational Leadership
East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education in Educational Leadership

by

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October, 2017

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IN AN EASTERN NORTH CAROLINA DISTRICT

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CHAPTER 1: INTRODUCTION

Naming and Framing the Problem of Practice

The ability to educate students with disabilities in a co-teaching setting begins with taking a laser clear view of the vital components necessary to have a strong co-teaching through collaborative planning process that produces positive results and outcomes for students with disabilities. The review of literature starts by focusing on the benefits of co-teaching through collaborative planning process. It is important to note that when co-teaching is discussed in special education, inclusion is assumed but is often and unspoken but integral aspect of the discussion. This is because co-teaching necessitates the group of students being treated as one entity. This entity is therefore an inclusive group. The role that principal support plays in co-teaching is covered in the second section of chapter 2. Staff development and its effect on co-teaching is reviewed in the third section of chapter 2. Co-teaching and its effect on the success of students is covered in the fourth section of chapter 2. Finally, Co-teaching and its effect on students' academic performance and outcomes are reviewed in section five of chapter 2.

The following areas were selected to be concentrated on in the Improvement Science study because, they were the topics which were most frequently reported on by Friend, Cook, Hurley-Chamberlain and Shamberger (2010), and Friend (2008) while reviewing co-teaching through collaborative planning process. Therefore, these areas were seen as a benefit towards improving the problem with co-teaching through collaborative planning process at Hertford County High School. This issue must be addressed because of high stake testing and accountability for all students enrolled in the Foundations of Mathematics 1 Course including those with disabilities, necessitates a level of academic success if they are expected to graduate from Hertford County High school with a regular high school diploma.

Geographic and Demographic Context

Hertford County has 25 large employers. Hertford County's unemployment rate was listed as 6.4% in April 2015. Its median household income from 2009-2013 was \$33,406 and 26.9% were below the poverty level during 2009-2013. Forty-seven percent of the residents owned their own homes in 2006-2010. Hertford County has 6,707 white collar workers and 3,715 blue collar workers. Agriculture is still the base of Hertford County's economy, with tobacco, cotton, peanuts, corn, and soybeans as both the agricultural and employment staples.

Educational Context

The educational system in Hertford County consists of seven public schools; Bearfield Primary School Pre-K- 3 with an enrollment of 897, Ahoskie Elementary School 4-6 with an enrollment of 505, Riverview Elementary School Pre-K- 6 with an enrollment of 485, Hertford County Middle School 7-8 with an enrollment of 454, Hertford County High School 9-12 with an enrollment of 816, C.S. Brown STEM High School 9-12 with an enrollment of 61 and Early College High School 9-12 with an enrollment of 100. An Alternative Learning Center 7-12 is located on the campus of C.S. Brown STEM High School with an enrollment of 8 students. Hertford County is a Title 1 School District and are a part of the Community Eligibility Provision-(CEP) Program in which all students receive free breakfast and lunch within the district. The district is accredited by the Southern Association of Colleges and Schools Council on Accreditation and School Improvement and the North Carolina Department of Public Instruction. The district offers a comprehensive curriculum, based on the Common Core and the North Carolina Standard Course of Study that is offered to all students in grades k-12. The school system employs approximately 620 staff members, including teachers, paraprofessionals, office personnel, custodians, food service, transportation, maintenance and central office.

The education level of the residents in the county is as follows; 1,615 residents are without a high school diploma, 2,833 residents have some high school education, 2,993 residents have some college education, 1,254 residents possess an associate degree, 1,733 residents possess a bachelors degree, and 843 residents possess a graduate degree. The demographic profile for the Hertford County School System is as follows: 25 American Indians, 18 Asians, 67 Hispanics, 2,642 Blacks, 514 Whites, and 45 Multiracial.

Description of Problem of Practice

The problem of practice in this Improvement Science study is focused on the effectiveness of co-teaching through collaborative planning process among general and special education Foundations of Math 1 Co-Teachers at Hertford County High School. The general educator and special educator come together for forty-five minutes to co-plan for the Foundations of Mathematics 1 course. During this time the teachers plan together, to determine the section of the course they will teach for the week based upon teachers' strengths and students needs according to assessment data results. Hertford County no longer has the EXTEND II Math Assessment for students with disabilities so all students are required to meet all assessment requirements. A problem exists with co-teaching instruction. Forty Foundations of Math 1 lesson plans were collected by the school administrator but there was little evidence of collaboration within the 40 lesson plans. Other evidence of problems with co-teaching instruction surfaced when only 10.6% of 31 special education students met the proficiency standard on the Foundations of Math 1 End- of- Course Assessment during the 2013-2014 school year and 0% met proficiency standards during the 2014-2015 school year. The students Benchmark results were reflective of their achievement level proficiency results. No students were rated proficient on the Benchmark examinations during school years 2013, 2014, and 2015.

The study of the Improvement Science problem at Hertford County High School will focus on co-teaching instruction through collaborative planning process for the Foundations of Math 1 Co-Teachers. After reviewing 40 lesson plans that were obtained from the grade level administrator, it was evident that collaborative planning wasn't occurring in this course. In fact, the exceptional children's teacher wasn't recognized once in the 40 lesson plans that were reviewed. In addition, the special education co-teacher's name did not appear on the plans nor did the special educator as co-teacher have a role in the planning process. Research has proven that when the co-teacher is not involved in the planning process, the co-teacher is viewed and treated as a teacher assistant not a highly qualified teacher in a co-teaching setting (Scruggs, Mastropieri, & McDuffie, 2007a).

Scruggs et al. (2007a) emphasized the importance of sufficient planning time in a co-teaching process and warned of the implications of the special educator's role being relegated to that of a classroom assistant. They stated that this happened to approximately 29% of the educators involved in collaborative planning. Mastropieri, Gardizi, Graetz, McDuffie, Noiland, and Scruggs (2005) in the study of high school world history classes found, when special education teachers are not fully involved in planning, the general education teacher assumed the lead role and became the dominant teacher. General education teachers became the curriculum experts and the special education teachers the manager of activities. Scruggs, Mastropieri, and McDuffie (2007b) stated that special educators often assumed the role of being a classroom assistant rather than a teaching partner. These researchers stressed that special educators must understand their knowledge and skills are essential to facilitating learning in co-teaching. In addition, they must have the other collaborative skills that enable them to negotiate roles and responsibilities in the co-taught class and to provide the necessary instructional supports for

students with disabilities. Without both sets of skills, it is more likely that they will remain classroom assistants than become instructional partners. Rice and Zigmond (2000) found that when special education teachers did possess adequate knowledge they assumed greater levels of instructional responsibilities. Nierengarten and Hughes (2010) contend when special educators are placed in unfamiliar subject areas, especially in a high school setting, they often feel vulnerable and have a difficult time keeping up with the content knowledge since they are learning along with the students. Harbort, Brown, Gunter, Hull, Venn, and Wiley (2007) state that special educators presented materials less than 1% of the time and observed or drifted around the room 42.24% of the time. Gurgur and Uzuner (2011) stated that without careful co-planning, co-teaching may not be any more advantageous than having one general teacher delivering the content. Bauwens, Friend, and Hourcade (1989), Lochner and Murawski (2011), and Sileo (2011) contend that in one or more models of co-teaching, the general education teacher maintains all responsibilities for delivering instruction whereas the special educator circulates around the room to monitor student performance. A special education teacher (personal communication, November 5, 2015) stated that she had been co-teaching with general education teacher for 3 years and that her role in the classroom consisted of making posters and observing students to ensure they were on task. She further stated the students did not respect her as a co-teacher. A general education teacher (personal communication, November 5, 2015) stated that she did all of the planning and that she used her special education co-teacher to make posters and assist students as needed during the co-teaching. These personal communications clearly depict the potentially undesirable conditions that can occur when co-teaching is conducted ineffectively.

Hanslovsky, Moyer, and Wagner (1969) traced the evolution of co-teaching to several related trends from the second half of the 20th century. During the 1950s educators in the United States and other developed countries questioned traditional school structures and procedures and their efficiency and effectiveness, and therefore turned to co-teaching as a more effective process.

This small scale Improvement Science proof of concept will focus upon difficulties that occur without adequate support systems in place for co-teaching through collaborative planning process. The study is informed by the Individuals with Disabilities Education Act Amendments 2004 (IDEA) and Every Student Succeeds Act 2015(ESSA). These laws describe both General and Special Educators roles in true collaborative co- teaching and also describe and the Principal's role in facilitating collaborative co-teaching process.

In fact, The Every Student Succeeds Act 2015 (ESSA) Requires- for the first time- that all students in America be taught to high academic standards that will prepare them to succeed in college and careers. Historically, special education teachers working with students with disabilities have used data to measure progress toward goals and objectives in the students' individualized education programs (IEPs). However, with IDEA 2004, there is a renewed emphasis on ensuring that children with disabilities are actually learning (Pierangelo & Giuliani, 2006), and that learning is connected to the general curriculum (IDEA, 2004). In fact with this focus on academic outcomes and access to the general curriculum, there is increased pressure for accountability in the education of students with disabilities in the general education classroom. Therefore, collaboration between general and special educators is more important than ever, as is a need for a variety of assessment strategies to support and document improved outcomes for students. Scruggs et al. (2007a) contend that Co-Teachers in inclusive classrooms often use the

unequal “*one teach/ one assist*” model in which the general education teacher handles content and the special education teacher serves as an assistant (in a role similar to that of a teacher aide). Lawter (2013) stated that co-teaching is defined as the partnering of a general education teacher or another specialist for the purpose of jointly delivering instruction to a diverse group of students including those with disabilities or other special needs, in a general education setting and in a way that is flexible and deliberately meets their needs.

Co-teaching process has been found to have a positive impact on student academics in a co-taught classroom. It was often found that students perform better in a co-taught setting and their academic outcomes are better in reading and mathematics than students that are instructed by a single content area teacher (Friend, 2008; Friend et al., 2010)

In summary outcomes of co-teaching through collaborative planning process and its impact on student learning is dependent upon several factors as cited in the literature (Gurgur & Uzuner, 2010; Parker, Allen, McHatton, & Rosa, 2011).

The principal must buy-into the process and allot time for co-teacher planning:

1. Staff development for the teacher is imperative to ensure co-teaching process is being implemented with fidelity to ensure learning during a co-taught lesson.
2. Staff development for the principal is vital to ensure they know what to look for during classroom walk-throughs, delivery of co-teaching process, and when implementing yearly observations (Scruggs et al., 2007a).
3. Allotting 45 minutes per week or 90 minutes per month is crucial to ensure time for collaborative lesson planning for a successful co-taught lesson (Gurgur & Uzner 2011).

4. With the necessary targeted co-teaching components in place research has shown a positive correlation for academic growth in reading and mathematics for students with disabilities (Bauwens, Friend, & Hourcade, 1989).
5. Therefore the success of any co-teaching project is dependent upon these elements being evident at all stages of the co-teaching project.
6. It is the belief of senior administrators in the School System and the researcher/organizational improvement manager for this project of co-teaching through collaborative planning process to serve as a small scale proof of concept model which can be a leveraged for improving co-teaching throughout Hertford County.

Problem Statement and Measure of Improvement

Collaborative Teaching with Special Education and General Education teachers has not been implemented effectively in the Foundations of Mathematics 1 Course at Hertford High School. The result has been a failure to achieve growth that is acceptable on the Benchmark assessment. The Measure of Improvement for this small scale proof of concept Organizational Improvement Project is to achieve growth on the Benchmark assessment during the 2016-17 school year by aligning the benchmark assessment with the North Carolina State Standards and Co-teaching through collaborative planning process.

CHAPTER 2: REVIEW OF LITERATURE

The Benefits of Co-Teaching

Friend et al. (2010) contended that co-teaching has evolved rapidly as a strategy for ensuring that students with disabilities had access to the same curriculum as the other students while still receiving the specialized instruction to which they are entitled. They agreed that the interest in co-teaching has intensified considerably. One key factor contributing to this interest is the Every Student Succeeds Act 2015, including the requirements that all schools and districts, (a) provides support to high schools where one – third or more of students do not graduate, (b) it also provides support to schools with groups of traditionally underserved students who consistently demonstrate low performance, (c) the law requires data on student achievement and graduation rates to be reported as well as action in response to that data, (d) however, unlike NCLB, states, districts, and schools will determine what support and interventions are implemented, (e) ESSA provides states and districts with a great degree of flexibility and responsibility, (f) developing such state-set policies that relate to “n-size” achievement and graduation goals, timelines for progress, and school improvement strategies warrants the strong involvement of diverse communities and education experts, and (g) the alliance is committed to working in partnership with civil rights organizations and others to support states in ensuring an equity-driven implementation of this bill. Co-teaching is the vehicle through which legislative expectations can be met while students with disabilities at the same time can receive the specially designed instruction and other supports to which they are entitled. Friend et al. (2010) stated that co-teaching seems like a relatively straightforward way of ensuring students with disabilities are receiving the education to which they are entitled by both educational and civil rights legislation and its interpretation. Lawter (2013) reported that the partnering of a general

education teacher and a special education teacher or another specialist for the purpose of jointly delivering instruction to a diverse group of students, including those with disabilities or other special needs, is a method that is flexible and deliberately meets their learning needs. Nichols, Dowdy, and Nichols (2010) acknowledged that the co-teaching model was designed to include disabled students in the regular classroom, but in a manner which provides the necessary accommodations to be successful. Mastropieri et al. (2005) emphasized that co-teaching would assist in the effort (a) to increase instructional options for students, (b) to enhance the participation of disabled students within the classroom, and (c) to enhance the performance of students with disabilities. Lawter (2013) indicated that students in co-teaching model classrooms get the attention of two teachers. This could not only be helpful to students who have special needs, but to those who have not been identified. Special education and regular education co-teaching offers a more enriched curriculum than would be offered in the absence of the co-teaching model. Graziano and Navarrette (2012) claimed that co-teaching is intuitively appealing to many because it makes maximum use of human resources in the classroom, which enables teachers to better meet the diverse needs of their students through a smaller student-to-teacher ratio and more individualized support and attention. Yopp, Bonsangue, Duarte, Ellis, and Meza (2014) claimed that the students felt more attentive and engaged when both were fully involved in the lesson together. They said that students enjoyed the benefits of hearing the two explanations of the materials. At the same time, each student group recognized the value of using a co-teaching approach to create a more engaging classroom. Nolet and McLaughlin (2002) reported that co-teaching is viewed as a service delivery model that has responded well to the evolving educational policy requiring increased access to general education curriculum. Milteniene' and Venclovaite' (2012) asserted that Europeans countries had already signed the

Salamanca Declaration in 1994 recognizing inclusion education as a key strategy helping the creation of an open and tolerant society, ensuring equal opportunities and quality education for all society members. Sun (2007) agreed that children with special needs regardless of disability, improved their likelihood for post-school independence as a result of increased participation in the general education setting. Kloo and Zigmond (2008) contended that co-teaching is a service delivery model for students with individual education plans to get the necessary support that they need to function in the general education classrooms. In a co-taught structure no student is singled out, the whole class gets assistance, and this can help reduce the stigma of getting extra help. Seymour and Seymour (2014) emphasized that co-teaching was originally enacted in an effort to (a) maintain favorable student to teacher ratios, (b) it has also been used to introduce new faculty members to the classroom, (c) to provide great diversity of opinion, and (d) in some cases to provide students with interdisciplinary instruction. Seymour and Seymour (2014) showed that those with the desire for improving teaching skills possess a stronger interest in collaboration or in creating an enhanced learning experience for students. They contended there is enough evidence to consider co-teaching on a limited basis in diverse classrooms. McGregor and Vogelsberg (1998) stated that the number of children with disabilities educated in general education or inclusive setting, has increased for the past 30 years and over this time has consistently supported the practice of inclusive education. Jones and Harris (2012) found that, although it may be expensive in time and energy, multiple instructors working together in a classroom can be especially effective at meeting the high level learning goals related to improving expert-like understanding and behaviors. In contrast, multiple instructors teaching alone and rarely interacting with each other was found to be the least effective model. Friend and Bursuck (2009) documented that team teaching was the most preferred co-teaching approach.

Moreover, it was found during the delivery of the team teaching approach that: (a) faculty members concurrently delivered instruction, (b) provided directions for activities, (c) interjected clarifying comments and questions, and (d) shared ideas and anecdotes to support the concepts being taught in the classroom. Hepner and Newman (2010) reiterated that co-teaching was an educational model that provided support to students with learning disabilities and also provided opportunities for high performing students to be academically challenged. Hepner and Newman (2010) contend that there are important questions to discuss as co-teaching teams prepare for the school year and on-going reflection to ensure they are meeting their co-teaching goals. Effective Co-Teachers spend time preparing for the year by discussing common and divergent beliefs about education and classroom routines and setting aside time throughout the year to reflect on and improve their practice. In fact, the researchers noted that effective co-teaching requires constant communication, collaboration, and reflection. Based on the findings of Avramidis and Norwich (2002), teachers' attitudes are a significant determinant of success in inclusive classrooms and teacher's attitudes affect behaviors and in turn influence the classroom climate and students' opportunities for success. Sileo and Garderen (2010) insisted that co-teaching structures can benefit students and teachers, and co-teaching structures will enhance student learning. Thus it is imperative to consider the subject matter and the co-teacher's strengths, when deciding upon which part of the lesson the Co-Teachers are implementing during the co-teaching session to ensure impactful student academic outcomes. General and special educators can work together to blend their knowledge base. This relationship is invaluable because it weds content and strategy specialist, and allows teachers an opportunity to meet all students' mathematical learning needs.

In this improvement project, co-teaching would provide the opportunity for two certified teachers to be in the classroom providing instruction during a lesson. Students would gain the benefit of one certified content area teacher and one exceptional teacher with a strong knowledge base in strategies in the classroom instructing collaboratively. Teachers would co-teach in their area of strength based upon data gained from assessment results to ensure mastery of content standards during the co-taught lesson.

Principal's Support for Co-Teaching

Principal support is vital for successful delivery of the co-teaching through collaborative planning process. Parker, Allen, McHatton, and Rosa (2011) and Gurgur and Uzuner (2010) listed the necessary components for co-teaching success. These were (a) compatibility in Co-Teachers, (b) self- selection for participation in a co-teaching partnership, (c) structured planning time, and (d) support from school administration. Embury and Dinnesen (2012) emphasized that co-teacher training for administrators is vital to ensure she / he would know what to look for in classrooms, delivery of co-teaching process, and to understand the types of support that effective Co-Teachers need. In this way, an administrator could function to provide accountability as well as become a resource for Co-Teachers in planning and delivery. Seymour and Seymour (2014) claimed in their research that there's hardly an article on team teaching that doesn't mention the importance of co-planning time. To some extent, this is a result of the literature being primarily associated with elementary and secondary education where teachers need the support of administration for coordinated planning periods. In fact, while this issue is somewhat lessened in high school education due to greater scheduling flexibility, time for common planning is still something that should be carefully considered. In fact, this collaboration is especially critical when more than two faculty members are involved, since multiple schedules can be very

challenging to accommodate. Embury and Dinnesen (2012) believed that these additional suggestions for practice include co-teaching training for administrators to ensure she/he would know what to look for in classrooms and understand the types of support that effective Co-Teachers need. In this way, an administrator could function to provide accountability as well as become a resource for Co-Teachers in planning and implementation. Villa, Liston, Nevin, and Thousand (2008) stated that school principals play a key role in promoting collaboration and the use of inclusive practices. Cawalti (1994) and Zaretsky (2005) contended that to craft inclusive learning communities principals must (a) build consensus about the worth of related practices, (b) re-organize and expand associated resources, (c) implement measures to ensure staff can develop the knowledge and skills required, (d) create relevant incentives for all involved, and (e) promote public awareness concerning associated school policies, procedures, and initiatives. Villa et al. (2008) reported that the efforts to expand the use of inclusive practices at secondary levels within the school, Brunei Darussalam, were unlikely to be successful without the support of the school principal. It is essential that relevant means be devised to garner and build the principals' support for co-teaching. Phillips and McCullough (1990) believed that in order for co-teaching to be successful at any grade level there are barriers to overcome such as: (a) developing a collaborative working relationship among Co-Teachers, (b) identifying and using problem-solving strategies successfully in the co-teaching setting, (c) increasing the collaborative skills and roles among Co-Teachers, and (d) finding time for Co-Teachers to get together to meet or plan. Building administrators can do a great deal to pave the way for a successful co-teaching experience for general and special educators and the students involved in the practice. In fact, active, visible involvement of administrators is the key in both planning and implementing of successful co-teaching. Nierengarten and Hughes (2010) acknowledged that the

role that administrative support plays in the success of co-teaching cannot be overstated. Nearly every factor for successful co-teaching implementation is dependent on an administration that is supportive and invested in the initiative. Scheffel, Hoernicke, Kallam, and Smith (1996) claimed that the school administration must guide the school and its faculty and staff toward developing a school philosophy based on the democratic egalitarian principles of inclusion and provide strong leadership to ensure decisions are made consistent with the school's philosophy.

Nierengarten and Hughes (2010) suggested that observations also convey to the co-teaching teams that the administration values the teacher investment. Through observation, administrators communicate; they acknowledge to the teachers that they have assumed a level of ownership, accountability and acknowledgement of a teacher investment in this effort. Villa, Nevin, and Thousand (2008) stated that administrators play a significant role as the primary advocate and cheerleader for the co-teaching team. Serving as the official *cheerleader* for this new initiative, the principal can support the teams through the challenges and hurdles that are inherent in any new endeavor. Walther-Thomas, Bryant, and Land (1996) reported that during the different stages of co-teaching, there needs to be a leader who would provide the vision, incentive, and belief in the teachers and the process. The administrator's role in the co-teaching process is to inform the parents and the community of the new initiative and its benefits such as: (a) students in co-taught classes obtain higher achievement grades in reading and mathematics, (b) students in co-taught classes develop better social skills, and (c) students in co-taught classes have the opportunity to be instructed by two certified teachers in one classroom setting. Blanton and Pugach (2007), Beaton (2007), and Beauwen and Hourcade (1996) acknowledged that in the absence of the following co-teaching components there would be a negative impact on the co-teaching process: (a) the administrator not providing a policy and schedule for collaborative co-

planning activities, (b) the administrator not being willing to be flexible for the initiative, (c) the lack of administrative support, (d) the administrator not allotting time for common planning for the Co-Teachers, (e) the administrator not being available to consult with the Co-Teachers to provide feedback on the initiative, (f) the administrator failing to reduce the Co-Teachers workload, so that they could implement the initiative with fidelity, (g) the administrator failing to select teachers with similar personalities to co-teach, (h) the administrator selecting Co-Teachers that are not able to see eye to eye on teaching styles and approaches in the co-teaching setting, and (i) the general educator's lack of knowledge in the areas of co-teaching and issues related to special education. Therefore, it is imperative that the building level administrator institutes all of the prescribed components of the co-teaching initiative, if there is going to be a positive impact during the co-teaching through collaborative planning process. Reynolds, Murrill, and Whitt (2006) claimed that a final group of professionals for whom co-teaching should be a priority are school administrators, principals and other site administrator's. They cannot be expected to lead school staff members through this fundamental change or to integrate it with other school improvement efforts without increasing their understanding of it. In fact, these leaders have the responsibility to (a) partner teachers, (b) arrange schedules, (c) create a common planning time, and (d) resolve dilemmas that arise. As a result, they explain co-teaching to parents and community members and ensure that programs are accountable and sustainable. Ultimately, this is why such a strong emphasis was placed on the administrator's section of the small scale Improvement Science Study because it is the root of a successful and productive co-teaching through collaborative planning process.

Principal buy-in is vital to the delivery of effective co-teaching through collaborative planning process in a classroom. The administrator is the determining factor in deciding if the

Co-Teachers would be allotted a forty-five minute planning period during the week too plan for a successful co-teaching lesson. The administrator would be the one to determine if time would be set aside to monitor the delivery of the lesson (a) to ensure learning is occurring during co-teaching instruction, (b) to provide the Co-Teachers with the necessary feedback gained from monitoring, and (c) to ensure continuous professional growth. The building level administrator is expected to have a knowledge base of (a) the co-teacher's role in a co-teaching setting, (b) the six co-teaching processes, and (c) the qualities of an excellent co-teaching lesson plan format. Furthermore, the administrator should learn how to observe the Co-Teachers for delivery of the process to ensure students are learning. In addition, this should occur via the administrator attending co-teaching staff development activities provided by a co-teaching expert.

Professional Development and Its Role in Co-Teaching

In the literature being reviewed during the study, it was imperative to focus on the area of professional development because of the role that professional development plays in implementing the co-teaching process with fidelity. In fact, professional development was identified as a component of the process that Co-Teachers in this project viewed as being a deficit. Teachers therefore expressed a strong need for more training to ensure delivery of the co-teaching process with fidelity. We will analyze the literature on professional development implemented in co-teaching based upon the problem of practice at Hertford County High School.

Potari, Chatzigoula, Manaridis, and Sakonidis (2010) acknowledged that teachers found it very interesting to view their teaching through somebody else's eyes. They liked it very much and wanted their evaluation findings aligned to their professional development on co-teaching. Potari et al. (2010) stated in the article that teachers often act on behalf of the mathematical knowledge that they possess and not in favor of student learning. Teachers follow a pre-

determined agenda of work for their professional development. Duchardt, Christensen, Inman, Marlow, and Reeves (1999) promoted professional development between and among faculty to improve student outcomes. Walther-Thomas, Korinek, and McLaughlin (1999) emphasized that the lack of staff development specifically targeting co-teaching strategies in planning and the delivery process were often missing in the inclusion model. Furthermore, Co-Teachers felt these components should be included if you are expected to achieve success with the process.

Avramidis and Norwich (2002) reported that approximately 30% of all teachers surveyed believed that the general education teachers do not have enough expertise and training on the inclusion models and teachers are consistently in need of co-teacher training. Crow and Smith (2005) encouraged co-teaching staff development in behavioral sciences, as an important teaching tool for students and faculty at the university level. Chanmugam and Gerlach (2013) explained that co-teaching presents benefits that may be especially relevant for the professional development of doctoral students preparing for career as university faculty. Co-teaching can be supportive but challenging method for doctoral students to increase self-awareness and hone skills. As graduate programs contemplate how to teach effective pedagogy, co-teaching can be a useful strategy for programs to consider. Nichols et al. (2010) described a study in which twenty-four schools districts indicated that the co-teaching model had been initiated in their districts. The size of the school district did not reveal any pattern of staff development that did or did not take place prior to initiating co-teaching. Of the twenty-four school districts surveyed three indicated that they had provided staff development prior to the program initiation and respondents from each of the three indicated that it was of superior quality that included regular education and special education teachers. Only one of the three indicated that school administrators were present in the staff development activities. In this study the eight school

districts with enrollments in excess of 2,000 students each indicated that co-teaching had been initiated. One district indicated that it provided staff development to regular education teachers, special education teachers and school administration. The respondents also indicated that the staff development was of superior quality. Of the eight schools districts with enrollments of greater than 1,000 but less than 2,000 students each indicated that co-teaching had been initiated. Two districts indicated that staff development involved regular education and special education teachers, but no school administrators. The respondents indicated that staff development activities were of superior quality. Of the eight school districts with enrollment of 1,000 or fewer students each indicated that at least some form of co-teaching had been initiated. None of these districts had provided staff development. The respondents from school districts that had provided staff development all indicated that it was of superior quality, but only one of the twenty-four districts surveyed indicated that educational leaders (administration) participated. It was clear from the study that involvement from top administrators was necessary to ensure the model was implemented with fidelity to ensure student learning. Moreover, this would include high level administrators attending training sessions on co-teaching which would be provided by an expert in the area of co-teaching. Administrators would have to allot time in their schedule, to be in the classroom to observe, to ensure the Co-Teachers are delivering the model with fidelity and moreover, you must provide Co-Teachers with the necessary follow-up feedback to ensure continuous growth in implementing the co-teaching process.

Yopp et al. (2014) stated that co-teaching was new to all participants in their study although several of the master teaching fellows had worked with special educators in the classroom for a number of years, none had received training in how to best take advantage of having two teachers in the classroom. They defined co-teaching as having two teachers assigned

to one classroom; with one teacher a general educator that specialized in his/her content area of study and the other teacher a special education teacher with the skills necessary to provide the strategies necessary to meet the student's individualized academic needs. Both teachers are held accountable for teaching to their strengths to ensure maximum learning. Typically, the special educators served as an assistant in the classroom and provided individualized support to students during a lesson. In fact, it was primarily through their shared experience of learning together to successfully implement new strategies that the teachers, new and experienced, grew professionally. Yopp et al. (2014) contended that, with a co-teaching model, new teachers learn from the start that the profession of teaching should be built on professional collaboration rather than isolation. As the Common Core State Standards for Mathematics begin to be implemented, the co-teaching model may be especially useful for mathematics credentialed programs that seek to develop effective curricular implementation and meaningful professional relationships within the teaching community. Mirza and Iqbal (2014) acknowledged that in Pakistan single teacher teaching is practiced in schools. Findings show that co-teaching (CT) is a better alternative to be implemented than a single teacher teaching mathematics. It is recommended that pre-service teacher training institutions should include *CT in mathematic* as a unit in the methods of teaching course. Tremblay (2013) described a professional development model in which the participating teachers initially attended an information session and one meeting with their future colleague during the school year prior to implementing the co-teaching process. The first session consisted of an individual meeting with the (a) volunteer teacher, (b) the principal, (c) their immediate' school supervisor, and (d) school counselor, during which the teachers were informed of the project goals and limitations and were able to address any concerns. During the second session, this time spent with their co-teacher, they went over the various possible configurations and

explored several themes of the co-teaching model and its implementation in terms of (a) planning, (b) schedules, (c) academic programming, and (d) intervention plan. One half-day was then set aside to enable both Co-Teachers to meet alone in one of their classes to plan their next meeting.

Thereafter, two training days were organized during the year with all of the participating co-teaching teams. During the first year, the first day was divided into three segments: (a) a traditional training session during which the teachers were given content relative to co-teaching and individualized methods, (b) a presentation of a video filmed in one of the classes, which enabled the group to analyze the practices they saw and to apply the acquired training content, and (c) finally, focus groups where the teachers were asked to react to various situations proposed by the moderator that recalled various aspects that were potentially problematic to the implementation of the co-teaching model in a classroom (advantages and disadvantages, major challenges, role sharing). The second training day proceeded along the same lines, with the exception of a discussion period in the morning and training content that addressed educational differentiation.

Walsh (2012) stated that the most significant impact of an effective professional development program was a systemic and continuous professional development that provided support for co-teaching teams in all of the 70 comprehensive schools systems he observed 6 years demonstrating that professional development for teachers and students were vital for a successful co-teaching program. Killion and Harrison (2006) noted that the Designing Quality Inclusive Education (DQIE) Program was developed in 2002 to provide professional development and demonstrated and modeled a variety of co-teaching approaches to be use for different instructional purposes along with strategies for the differentiation of instruction

essential for the diverse learners in co-taught classrooms. Darling-Hammond and McLaughlin (1995) recognized that effective co-teaching professional development must be (a) sustained, (b) intensive, and (c) collaborative. Walsh (2012) believed that critical to the success of the DQIE professional development was the needs assessment that each participant completed to identify (a) school supports, and (b) as well as teacher skills and strategies essential to improve the quality of inclusive classrooms in their school. The most frequently identified support by school staff was funding to provide time for Co-Teachers to plan together on a regular basis. Upon the completion of the DQIE professional development program there was an increase in the less restrictive services for students with disabilities. This increase correlated with positive trends in the performances of students with disabilities on state assessments. DQIE professional development has been used for the past year as a systems level strategy to accelerate the achievement of underperforming special education student groups in identified schools on the basis of state assessment data. Walsh (2012) emphasized the significant increases in reading and math co-taught classrooms supported by DQIE professional development was correlated with the year-long professional development provided to Co-Teachers in these schools. Furthermore, DQIE professional development staff received 4 days of coaching training in effective strategies and followed it up with off-site professional development sessions with classroom observations and feedback relative to the demonstrated co-teaching and differentiation strategies, which, in effect, individualized the professional development to address each teacher's needs. Killion and Harrison (2006) reported, as a result of the research of Joyce and Showers (1995) that accelerated student outcomes, demonstrated the well-researched positive effect of professional development when combined with (a) demonstration, (b) practice, and (c) coaching. Reeves (2010) found that when professional learning is clearly linked to student learning there are

accelerated outcomes. Walsh (2012) believed that through the commitment in 2002 to the long range implementation of a system-wide professional development program focused on fostering quality co-teaching and the establishment of school improvement accountability parameters that emphasized inclusive collaborative teaching using differentiated instruction, and the institutionalization of teacher observation practices that focused on the elements of quality co-teaching in classrooms visits by school administrators overall improvement in instruction could be maximized. Milteniene' and Venclovaite' (2012) agreed that the professional development for teachers should take place while preparing them for co-teaching and demonstrated how such a model could help students with special education needs (SEN) so that the experience of only one teacher working in the classroom would change. Gaff, Lyons, and Watson (2011), and Namukasa and Gadanidis (2010) acknowledged that providing students with opportunities to use manipulatives in order to facilitate hands-on learning had the potential to deeply engage students in learning activities. In addition, more collaborative professional development and frequent lesson study sessions might be beneficial to set the stage for more mathematical discourse and improved learning outcomes. Florien and Rouse (2001), and Sharpe and Hawes (2003) agreed that if schools are to maximize the extent to which they are to educate children with special education needs in the regular classes in accordance with inclusive principle' it requires (a) facilities, (b) technology equipment, (c) human resources, and (d) training provisions. Magiera, Battaglia, Marotta, and Simmons (2005) reported that administrators need training. They need to attend trainings before or along with the teaching teams that would be implementing co-teaching so that there is an awareness of the demands and skills that are required to successfully put co-teaching into practice. Walther-Thomas et al. (1996) have noted that prior to training for co-teaching teams, administrators should have an understanding of the practice of co-teaching. The

administrators can provide (a) vision, (b) support, and (c) understanding for the general and special educators implementing the model. Administrators would be able to proactively address potential problems and issues before they lead to discouragement and frustration. Nierengarten and Hughs (2010) claimed that through co-teacher training a clear understanding of administrative roles and responsibilities could be communicated, which would provide the background knowledge for better decision making in the schools by the administrator. Cook and Friend (1995), and Dieker and Murawski (2003) emphasized that teachers must be trained prior to implementing co-teaching. Although this appears to be an obvious action step, it seldom occurs. Teachers are often placed together in a classroom without adequate preparation to teach. To be successful in a collaborative co-teaching arrangement teachers would need training and preparation that would help to develop skills in (a) communication and collaboration, (b) instructional strategies responsibilities, (c) building on another's strengths, and (d) understanding of content. Lochner and Murawski (2011) insisted that the administrator would need to observe the co-teaching teams once they have been trained. The administrators are knowledgeable about the components needed to implement co-teaching and can be a valuable asset to the effectiveness of the practice of observing Co-Teachers in an effort to provide feedback that would be helpful in aiding co-teaching improvement.

Phillips and McCullough (1990) stated that continued professional development must be provided. The investment of continued program maintenance and the enhancement of learning opportunities are essential to the longevity of any new initiative. It was also stated by Phillips and McCullough (1990) that co-teaching teams required continued education support and training in order to keep the initiative alive. Phillips and McCullough (1990) reported that program enhancement is initiated when the basic skills of co-teaching have been learned and

participants are receptive to refining techniques or exploring further options. This enhancement can take the form of (a) observing other co-teaching teams, (b) reading books, or viewing videos related to co-teaching, (c) attending conferences, and (d) collaborating with institutions of higher education. All of the efforts towards professional development yields a high return and communicate to teams that their effort is viewed as a worthwhile investment. Scruggs et al. (2007a) have affirmed that co-teaching has demonstrated a positive impact on student achievement, and that administrators, teachers, and students perceive co-teaching to be socially and academically beneficial to general and special education students. Walsh and Snyder (1994) acknowledged that in the 1990s that there were consistent benefits demonstrated by students assigned to co-taught classrooms these students performed significantly better on state assessments as compared with general education classrooms without co-teaching.

Co-teaching professional development is vital to the successful delivery of a co-teaching through collaborative planning process. Therefore, professional development is necessary to ensure the general educator and the special educator are delivering co-taught lesson with fidelity. Professional development is vital for the principal of a school because it would assist the administrator in knowing what to look for during a co-teaching observation, delivery of the lesson and how to effectively provide feedback to the Co-Teachers to ensure growth and learning in a co-taught classroom.

Six Approaches to Co-Teaching

Friend (2008), and Friend et al. (2010) offered six approaches to co-teaching: (a) One Teach, One Observe: One teacher leads while the other observes the students in the class; (b) One Teach, One Assist: one teacher is the active teacher while the other circulates and assists students. The co-teacher (1) answers questions, (2) directs attention, and (3) provides additional

explanations; (c) Station Teaching: students rotate among several different learning stations. Each co-teacher leads a station, while the other stations are completed individually by students; (d) Parallel Teaching: The class is divided into two heterogeneous groups. Each teacher provides the same instruction to one of the groups; (e) Alternative Teaching: (1) Pre-teaching, (2) re-teaching, (3) review, and (4) accelerated instruction are provided by a co-teacher to a small group while the other teacher leads the remaining large group; (f) Team Teaching: Both teachers equally share the instructional delivery because they know the curriculum and they are at ease with each other's teaching style and management techniques. This model takes longer for teachers to feel comfortable implementing. Polly (2012) indicated that expert coaching has promise to support mathematics instruction through activities such as (a) co-planning, (b) feedback on lessons, and (c) co-teaching. Conderman and Hedin (2012) stated that in a co-taught classroom, not only can teachers respond to questions more promptly, but they also can meet student's needs by adjusting the prompt type questions and response mode to verbal versus written. For example, during a quiz, it was acknowledged that several students did not understand the wording on a problem the co- teacher verbally restated the question, which allowed the student to successfully complete the problem. Harris, Graham, and Santangelo (2008) stated that Co-Teachers can use formative or summative assessments after instruction, for the purpose of monitoring the progress that students are making on an assignment after being instructed by a general educator and a special educator in a co-taught classroom.

Winn and Blanton (2005), and Bahr and Kovalski (2006) reported that the benefits of collaboration are numerous and includes: (a) increased resources to support student progress, and (b) shared problem solving to address student needs. Friend and Cook (2007) cited that the general educator and the special educator share accountability for student achievement in co-

teaching classrooms. Jones and Harris (2012) emphasized that it may be expensive in time and energy for multiple instructors to work together in a classroom but they can be especially effective at meeting high level learning goals related to improving expert-like understanding and behaviors. Jones and Harris (2012) contended that multiple instructors teaching alone and rarely interacting with each other were found to be the least effective model of instruction. Hansen and Morrow (2012) agreed that access to instruction in the general education classroom for the vast majority of students with disabilities would be best provided by the general education teacher who had both depth and breadth of specific content knowledge and skills if it were paired with the expertise of the special education teacher. Massetti, Ehrhardt, Kipp, Layhey, Lee, Loney, and Pelham (2008) discussed that students receiving special education services often demonstrate academic underachievement due to the special educator's lack of subject area content knowledge. Dessemontet (2012), and Kurth and Mastergeorge (2010) stated that inclusive education has been associated with improved academic outcomes for students with disabilities when Co-Teachers plan together for a lesson. Murawski and Dieker (2004) emphasized that an effectively implemented co-teaching model ensures that all students with disabilities have access to high quality instruction from an instructor trained as a content expert, while providing benefits for all students by increasing adult support and expertise in a co-teaching setting. Cook and Friend (1995), Dicker and Murawski (2003), and Friend et al. (2010) all contended that if students with disabilities are to be included in the general education setting and held accountable for mastering state standards, then the bottom line for practice is that the general educators and special educators must work in partnership in all aspects of instruction to serve students. Therefore, the ultimate outcome is academic success for all students in a co-teaching setting. Walther-Thomas (1997) emphasized that a co-teaching setting can improve (a)

academic performance, (b) social skills, (c) impact peer relationships, (d) enhance the self-confidence of students with disabilities, (e) improved study skills, and (f) enhance the classroom friendships among general education students. Geary (2004) found that approximately 5% to 8% of students have a learning disabilities in mathematics. Therefore, the general and special educators need effective instructional strategies and service delivery models to meet the needs of all students. Sileo and Garderen (2010) affirmed that co-teaching structures can benefit students and teachers. Although co-teaching structures can enhance student learning, it is also important to consider the subject matter. General and special educators can work together to blend their knowledge base. This relationship is invaluable because it combines content and strategy specialists, and allows teachers an opportunity to meet all students' mathematical learning needs.

It has been confirmed that when Co-Teachers are allotted forty-five minutes per week to co-plan by the building level principal the lesson will be delivered with fidelity and have a positive impact on the academic outcome. It is often stated that if the general educator and special educator collaboratively co-plan the special educator is implemented as an equal rather than in the role of a teacher assistant in a co-taught classroom.

Effect of Co-Teaching on Student Outcomes

The purpose of this section in the literature review is to describe the effect of co-teaching on student outcomes. If there is evidence of (a) maximum principal support, (b) successful staff development, and (c) effective collaborative co-planning provided for in the collaborative teaching model effects of co-teaching can be described as effective. Massetti et al. (2008) and Kurth and Mastergeorge (2010) stated that students receiving special education services in a separate setting often demonstrated academic underachievement, and student with disabilities being served in an inclusive education setting has been associated with improved academic

outcomes. Winn and Blanton (2005), Bahr and Kovaleski (2006), and Friend and Cook (2007) contended that the benefits of collaboration are numerous and include (a) increased resources to support student progress, (b) shared problem solving to address student needs, and (c) shared accountability for student achievement. Dugan and Letterman (2008) noted that there are many reasons college level co-teaching has been implemented. Broadly, it has been used to improve student academic outcomes. Brody (1994), and Crow and Smith (2005) affirmed that regardless of the impetus, the broader body of literature on co-teaching suggests its potential to enhance the teaching and learning experience for everyone involved in the model. Walther-Thomas (1997) stated that co-teaching improved (a) academic performance and social skills of all students, (b) positively impacted peer relationships and self-confidence of students with disabilities, and (c) improved study skills, and (d) classroom communities among general education students. Manset and Semmel (1997) stated that the inclusion models that facilitated curricular changes was designed to provide direct and intensive basic skills within the general education institution and tutorial programs for students with disabilities and were found to be effective. McLeskey and Ross (2004) emphasized that if students with disabilities are to be included in the general education setting and held accountable for mastering state standards, the general educators and special educators must work in partnership in all aspects of instruction to serve all students. Moreover, one of the biggest struggles for students with disabilities meeting state proficiency levels has been with blending the sciences of general and special education to guarantee that students with disabilities successfully progress in the general education setting at the same rate as their nondisabled peers. Villa et al. (2008) stated that the greatest promise of co-teaching is the teachers' ability to provide academic and behavioral support for all students. It benefits for students with disabilities are as follows; (a) improved academic performance, (b) improved self-

esteem, (c) improved confidence skills, (d) improved peer relationships, (e) students at risk of educational failure get the support of two teachers, and (f) students without disabilities get increased instructional time and individualized attention. Karp and Voltz (2000) confirmed that no one tactic is the best for students with disabilities, and it may be appropriate to blend practices to attain student goals and objectives. Lawter (2013) stated that successful co-teaching benefits all students and teachers and that meeting the diverse needs of all students is a challenging job. He stated that co-teaching is one of the effective models teachers can use to reach all students. Friend (2008) explained that the intuitive appeal of co-teaching as a means of improving the educational outcomes of students with disabilities cannot be denied. McLaughlin and Walther-Thomas (2002) affirmed that students with learning disabilities assigned to co-taught classes performed better on measures such as report card grades and attendance than students in single teacher class. However, students performance on high stakes tests was comparable across the types of classes.

Murawski (2006) emphasized that, she found no significant differences across setting, commenting that the failure to find increased achievement in co-taught classes may have been the results of lack of training and uneven implementation. Wilson and Michaels (2006) stated that students surveyed stated they would participate in another co-taught class if given the opportunity, and that they received better grades in co-taught classes when compared with their other classes. The students reported that: (a) more help was available in the co-taught classes, (b) multiple instructional approaches were employed, (c) multiple teaching styles and teacher perspectives were offered, and (d) more skill development was possible. Keefe and Moore (2004) reported positive outcomes for students involved in co-teaching arrangements from special education teachers and the regular education teachers. Special education students lost the

label and stigma of being learning disabled in co-taught classes. Both teachers reported students with learning disabilities operating at higher levels of achievement in co-taught classes.

Bacharach and Heck (2010) claimed that there is limited research on the impact of co-teaching on student learning and teacher candidate learning, the MAC-Minnesota Comprehensive Assessment at St. Cloud indicates that elementary students in classrooms that utilized a co-teaching model for student teaching outperformed peers in other classrooms on measures of reading and mathematics achievement. Yopp et al. (2014) stated that six of the seven master teachers fellows interviewed participants and (a) found co-teaching to be an effective and realistic student teaching model that supported their Co-Teachers, that (b) enhanced their own teaching, and (c) enriched learning opportunities for their students. Clarke and Kinuthia (2009) agreed that the use of different teaching styles during co-teaching (a) enhanced students' academic achievement, (b) improved the capability of students to critically evaluate the problems, and given reasons were able to apply the concepts effectively in different situations. Marble and Green (2014) found that in co-teaching situations (a) there was conversation between Co-Teachers, (b) they had control over their resources, and (c) accountability from both teachers was positively associated with student success. Mirza and Iqbal (2014) indicated that students taught through collaborative teaching performed better on the achievement test than the students taught by one teacher. Knackendoffel (2005), Nowacek (1992), Walther-Thomas et al. (1996), and Zigmund and Magiera (2002) acknowledged the need to maintain a balance and prevent the class from becoming a dumping ground, or being viewed as a special education class. Therefore, the rule of thumb is to allow no more than 25-50% of the composition to be learners with special needs, which includes students who are considered at-risk of failing to be assigned to an appropriate classroom. Villa et al. (2008) agreed that soliciting feedback on instructional

performance from students can make for better instructional decisions in future lessons being implemented in a co-teaching setting. Hang and Rabren (2009) acknowledged that students with disabilities had higher test scores after a year of co-teaching. Scruggs et al. (2007b) arrived at the conclusion that teachers tend to support the idea of collaboration, and achieve better results in teaching students with special education needs while collaborating; however, they still lack a clearer division of the functions of co-teaching. Muraski and Dieker (2004) stated that an effectively implemented co-teaching model can ensure that all students with disabilities have access to high quality instruction from an instructor trained as a content expert, while providing benefits for all students by increasing adult support and expertise. Murawski and Swanson (2001) witnessed that the effects of co-teaching on academic performance have been inconsistent across cases. Scruggs et al. (2007b) contended that co-teaching may serve to increase the inclusion and success of students with disabilities in inclusion classrooms, but simply placing a special educator and general educator in an inclusive classroom does not guarantee improved outcomes for students. Murawski and Swanson (2001), and Zigmond (2004) stated that two specialist coming together to create education synergy and some positive results continue to encourage co-teaching as a model that benefits all students. Goodman, Bucholz, Duffy, Hazelkorn, and Kitta (2011) indicates that the use of co-teaching has not demonstrated a significant difference for students in co-taught classrooms. Embury and Dinnesen (2012) reiterated that many teachers participated in professional development but what made the difference for these teachers in making real changes to their co-teaching through collaborative planning process was support provided on an ongoing basis by their building level administrator. In addition, schools and districts that want teachers to follow through with adopting co-teaching as an effective strategy for positively changing student out comes in inclusive classrooms would

need to build follow up support into co-teaching professional development for teachers and administrators. Kurz, Elliott, Kettler, Kloo, Lemons, and Zigmond (2014) affirmed that current findings indicated that Students with Disabilities (SWDs) receiving instruction in general education classrooms with Students with Out Disabilities (SWODs) were reported by their teachers to actually receive fewer opportunities to learn state standards. Walther-Thomas (1997) highlighted four benefits for students associated with co-teaching: (a) positive feelings about themselves as capable learners, (b) enhanced academic performance due to more time and attention from the teachers, (c) improved social skills, stronger peer relationships, and (d) improved classroom communities. Scruggs et al. (2007b) claimed that teachers benefited professionally from co-teaching experiences including an increase in (a) content knowledge, (b) classroom management, and (c) curriculum adaptation. Students without disabilities were reported to show (a) increased cooperation, and (b) experienced a positive social model from teachers in co-taught inclusive classrooms. Furthermore, students with disabilities received additional attention and support to meet their academic and social needs than what would have been available from a solo general educator taught classroom. Brownell, Adams, Sindelar, Vanhover, and Waldron (2006) agreed that regardless of the model, the focus is on teachers working together with an assumption that collaboration leads to improved student academic achievement. Magiera and Zigmond (2005) acknowledged that between 1986 and 2003, only 13 studies on co-teaching addressed student achievement. Seven of these studies showed significant positive academic gains for students with disabilities. Rea, McLaughlin, and Walther-Thomas (2001) compared two integrated models for students with learning disabilities (LD): a pull-in model with co-teaching and a pull-out model in a resource class. Compared with the other groups, the outcomes of the pull-in students were superior in first language, mathematics and

science. These authors also examined the social integration of these students and reported less negative behaviors and greater attendance. Fontana (2005) claimed that co-teaching had an impact on the self-esteem of secondary level LD students in math but not in writing. Hang and Rabren (2009) acknowledged that in comparing the outcomes of students with LD over two years following a solo teaching/co-teaching experiment found that co-taught students scored higher in reading and in math under co-teaching than they did the previous year in the presence of only one teacher. Hang and Rubren (2009) stated that co-teaching provided students with LD with the necessary support for academic achievement on standardized tests. Stainback and Stainback (1984) agreed that co-teaching can be described as a high leverage school system strategy that can result in continuous improvement for all students, and accelerated achievement for students with disabilities, when implemented with the necessary system-level supports and strategies. Walsh (1992) believed that students with disabilities (a) enjoyed school more, (b) learned more, and (c) felt better about themselves when they received special education services in a co-taught general education classroom as compared with a self-contained special education setting. Walsh (2012) claimed that the performance of students with disabilities has improved noticeably at all school system levels as access to general education for instruction has increased through co-teaching. Walsh (2012) acknowledged that co-teaching can be considered a high leverage strategy capable of accelerating achievement in reading and mathematics. As a result of, the significant increases in the reading and mathematics performance of special education students in co-taught classrooms supported by The Designing Quality Inclusive Education (DQIE) Program, professional development is correlated with the year-long professional development provided to Co-Teachers in these schools. The accelerated outcomes observed in these schools according to the Walsh (2012) study is partially attributed to the added strategy of

instructional coaching provided to Co-Teachers by DQIE special education and curriculum staff during the 2008-2009 school year. Joyce and Showers (1995) acknowledged there would be accelerated student outcomes when professional development is combined with (a) demonstration, (b) practice, (c) feedback, and (d) coaching. Reeves (2010) stated that accelerated student outcomes are evident when professional learning is clearly linked to student learning. Halvorsen and Neary (2009) emphasized that the most important parameter for an inclusive education service model such as co-teaching is assessed by the statement inquiring to what extent differentiated instruction to accelerate achievement for all students is evident in every classroom. Furthermore, differentiated instruction is clearly essential to address the learning and behavioral needs of students with diverse abilities. Moreover, it provides teachers with an established methodology to adopt their practices of curriculum and instructional design so that students achieve mastery of the content standards. Bauwan et al. (1989) stated that although there are continued calls for more efficacy research regarding co-teaching quantitative and qualitative research over the past 20 year, research has consistently determined that students in co-taught classrooms learn more and perform better on academic assessments than do students in more restrictive service delivery models. This is why co-teaching is the focus of the small scale proof of concept Improvement Science study at Hertford County High School in the Foundations of Math 1 course. Literature indicates that the co-teaching could have a positive impact on student academic outcomes, if the model is implemented with fidelity and has the buy-in of the administrator.

Co-teaching through collaborative planning process has been found to have a positive impact on student academics in a co-teaching classroom. It was often found that students perform better in a co-teaching setting and their academic outcomes are better in reading and

mathematics than students that are instructed by a single content area teacher. To sum up the outcomes of co-teaching and its impact on student learning is dependent upon several factors according to the literature in the co- teaching study implemented by the co-teaching scholar:

1. the principal must buy-into the process and allot time for co-teacher planning
2. staff development for the teacher is imperative to ensure the program is being implemented with fidelity
3. staff development for the principal is vital to ensure they know what to look for during their classroom walk-throughs and for the delivery of the co-teaching process while implementing their yearly observations
4. allotting 45 minutes per week or 90 minutes per month is crucial to collaborative lesson planning to ensure a successful co-taught lesson. As a result, with the necessary targeted co-teaching components in place literature has shown a positive correlation for academic growth in reading and mathematics for students with disabilities.

North Carolina End-of-Course Testing

Benchmark Testing

Benchmark assessments are created for schools based upon a pre-determined set of essential standards. According to the North Carolina Department of Public Instruction (NCDPI) the (1st benchmark) mirrors the End-of-Course test and the (2nd benchmark) is administered throughout the school year to give teachers immediate feedback on how students are meeting academic standards. Moreover, the regular use of benchmark assessments are seen by many as a tool used to measure student growth and to design a curriculum to meet individual learning needs.

Professional Development

Professional development is a process of improving and increasing capabilities of staff through access to education and training opportunities in the workplace, through outside organizations, or through watching others perform the job. According to the North Carolina Department of Public Instruction (NCDPI) professional development help build and maintain morale of staff members, and is thought to attract higher quality staff to the organization.

In summary the evolution of co-teaching evolved during the 1950s after the United States and other developed countries questioned traditional school structures and procedures and their efficacy and effectiveness. This research confirmed that students with disabilities perform better in reading and mathematics, after being instructed by two certified teachers in a single classroom setting. The co-teaching process allowed Co-Teachers to teach based upon their strengths according to assessment data and students needs based upon assessment data during the delivery of the co-teaching through collaborative planning process.

Definitions

Within this study, a variety of terms were defined or clarified. The following terms were important and included in the study:

Co-Teaching –two equally qualified individuals who may not have the same area of expertise jointly delivering instruction to a group of students (Walsh, 2012).

Inclusion- integrates children with disabilities into a mainstreamed classroom.

One Teach, One Observe-in which one teacher leads large-group instruction while the other group gathers academic, behavioral, or social data on specific students or the class group (Friend et al., 2010).

One Teach, One Assist-in which one teacher leads instruction while the other circulates among the students offering individual assistance (Friend et al., 2010).

Station Teaching-in which instruction is divided into three non-sequential parts and students, likewise divided into three groups rotate from station to station, being taught by the teachers at two stations and working independently at the third (Friend et al., 2010).

Parallel Teaching-in which the two teachers, each with half the class group, present the same material for the primary purpose of fostering instructional differentiation and increasing student participation (Friend et al., 2010).

Alternative Teaching- in which one works with most students while the other works with a small group for remediation, enrichment, assessment, pre-teaching, or another purpose (Friend et al., 2010).

Team Teaching-in which both teachers lead large-group instruction by both lecturing, representing opposing views in a debate, illustration two ways to solve a problem, and so on (Friend et al., 2010).

Collaboration-takes place when members of an inclusive learning community work together as equals to assist students to succeed in the classroom. This may be in the form of lesson planning with the special needs child in mind, or co-teaching a group or class (Tremblay, 2013).

Collaborative Planning-is a concept that aims to enhance supply chain integration by supporting and assisting joint practices (Embury & Dinnesen, 2012).

Individual Disability Education Act-(IDEA)-explicitly emphasize the importance of providing access to the general curriculum so that students with disabilities can meet the educational standards that apply to all children, NCLB, 2001 (Pierangelo & Giuliani, 2006).

Every Student Succeeds Act (ESSA)-requires for the first time-that all students in America be taught to high academic standards that will prepare them to succeed in college and careers.

General educator-have knowledge of the curriculum (Sileo & Garderen, 2010).

Special educator-have knowledge of instructional processes for students who learn atypically (Sileo & Garderen, 2010).

CHAPTER 3: METHODOLOGY

The Small Scale Proof of Concept Co-Teaching Introduction

Langley, Moen, Nolan, Nolan, Norman, and Provost (2009) emphasized that Improvement Science is defined as two separate word terms. First, Langley et al. (2009) looked at the term improvement and asked what was meant by the term improvement? Improvement has meaning only in terms of observation based on a given criteria. In other words, improvement is a useful concept when it is defined by characteristics such as faster, easier, more efficient, more effective, less expensive, safer, cleaner, and so on. Sometimes it is enough to observe the impact of a change on these characteristics, but usually it is best to document the impact (collect data). Because the concepts of improvement and change are tied together so strongly, it is more useful to define them together. Fundamental changes that result in improvement:

- alter how work or activity is done or the makeup of a product
- produce visible, positive differences in results relative to historical norms
- have a lasting impact

Science (from the Latin *scientia*, meaning knowledge) is defined in *Webster's New Collegiate Dictionary* as "knowledge attained through study and practice." Science refers to a system of acquiring knowledge of the physical world. This system must be based on observable phenomena and capable of being tested through the scientific method for its validity. Acquiring knowledge is essential for improvement activities, (a) whether it is a simple problem to solve, (b) a work process to improve, (c) a design or redesign of a product or service, or (d) improvement to a complex system. The question is, what kind of knowledge will allow us to develop, test, and implement changes that will result in improvement?

The most obvious answer is appropriate subject matter knowledge acquired through formal and informal learning and reinforced with experiences. Subject matter knowledge is basic to the things we do in life.

Bryk, Gomez, Grunow, and LeMahieu (2015) concurred that improvement science is an epistemic system that enables the improvement of practice, reliably at scale to: (a) embrace relevant content knowledge; (b) to study problem and systems analysis; (c) to acknowledge the understanding of variation; (d) to understand the disciplined inquiry of improvement research; and (e) as well as the theory and practices that support individual, social, and organizational change.

Study Design

The problem of practice in this Improvement Science study focused on the effectiveness of co-teaching through collaborative planning process among general and special education Foundations of Math 1 Co-Teachers at Hertford County High School. The general educator and special educator will come together for forty-five minutes during the week to co-plan for the Foundations of Mathematics 1 course. During this time the teachers will plan together, to determine the section of the course they will teach for the week based upon teachers' strengths and student's needs according to assessment data. Hertford County no longer has the EXTEND II Math Assessment for students with disabilities so all students are required to meet all assessment requirements. A problem exists with collaborative lesson planning. Forty Foundations of Math 1 lesson plans have been collected by the school administrator but there is little evidence of collaboration within the 40 lesson plans. Moreover, there is evidence of a problem with collaborative planning if only 10.6% of 31 special education students have met proficiency on the Foundations of Math 1 End of Course Assessment during the 2013-2014

school year and 0% met proficiency during the 2014-2015 school year. The students Benchmark results were reflective of their achievement level proficiency results. No students were rated proficient on the Benchmark examinations during school years 2013, 2014, and 2015. The study of the Improvement Science problem at Hertford County High School will focus on co-teaching through collaborative planning process between the Foundations of Math 1 Co-Teachers. After collecting and reviewing 40 lesson plans that were obtained from the grade level administrator, it was evident that collaborative co-teaching wasn't occurring in this course. In fact, the exceptional children's teacher wasn't recognized once in the 40 lesson plans that were reviewed. In addition, the special education co-teacher's name did not appear on the plans nor did the co-teacher have a role in the planning process. Research has proven that when the co-teacher is not involved in the planning process, the co-teacher is viewed and treated as a teacher assistant not as a highly qualified teacher.

It then follows, that a plan must be designed to address this problem of co-teaching through collaborative planning process at Hertford County High School. The plan will consist of the following steps:

- The Project Leader will meet with the principal at Hertford County High School to discuss allotting 45 minutes a week or 90 minutes a month to co-plan. In this meeting a plan for delivering a small scale proof of concept study for co-teaching through collaborative planning process will be discussed.
- After meeting with the principal the Project Leader will schedule a meeting with the principal, general educator, and special educator to discuss the co-teaching through collaborative planning process. In this meeting the co-

teaching staff will be made aware of the process that will be implemented weekly to ensure fidelity in co-teaching such as:

- Insuring forty –five minutes per week or ninety minutes per month of collaborative planning time are being used to plan for the process.
- Insuring team planning minutes are developed and gathered after the co-teacher planning meeting
- Insuring that a process for the Project Leader and principal to monitor the delivery of the co-teaching lesson is agreed upon by the Project Leader, principal, general education and special education teacher.

This process will include fidelity snapshots and mastery checks.

- Director will document areas needing improvement during the co-teaching lesson observation
- Director will provide feedback to the Co-Teachers on the findings from the co-teaching lesson observation
- Director will observe another co-teaching lesson to look for suggested recommendations made from the previous co-teaching observation. The purpose of the follow-up observation is to ensure that the Co-Teachers are delivering the co-taught lesson with fidelity and to ensure that suggestions made from the previous lesson are being delivered during the follow-up co-taught lesson.

It will be important that the basic principles of co-teaching process are observed in the lesson plans and actual classroom observations. The principles are encapsulated for lesson planning and classroom observations as follows:

- Do both teachers play an active role in co-teaching through collaborative planning process?
- Each teacher should teach at least one-half of every lesson.
- Does each teacher teach a substantial portion of the lesson in their area of strength based on assessment data results?
- Was there evidence of the EC teacher's teaching strategies being implemented to benefit EC and Regular students.
- Co-teaching and planning issues that should be evident in classroom observations of co-teaching.
- Without prior knowledge of the student's educational history can you identify whether students in the class are EC or Regular Education students.
- Do the EC students have an area of the classroom devoted to EC activities?
- Is there equal collaboration between the EC Teacher and the Regular Classroom Teacher during the co-teaching through collaborative planning process?
- Is there palpable evidence of a desire on the part of both the EC Teacher and the Regular Classroom Teacher to participate in a Co-Teaching process?

Director will continue to meet with the Co-Teachers during the co-teaching through collaborative planning process to ensure co-teaching is continuing to occur with fidelity and that the aforementioned principles are evident in lesson plans and classroom observations.

Federal Programs Director will meet with the general educator and the special educator to ensure planning is occurring for the forty-five minutes during the week or ninety minutes per

month. Co-teaching plans will be monitored for equal teaching time and for one of the six co-teaching processes:

- Director will observe Co-Teachers delivery of a lesson after collaboratively planning
- Federal Programs Director will observe a co-taught Foundations of Mathematics 1 lesson after collaborative planning has occurred between the general educator and special educator to check for fidelity and delivery of the process. Director will provide Co-Teachers with feedback and suggestions for making the lesson better for the next class. Director will constantly observe and document the Foundations of Mathematics 1 course to ensure feedback suggestions are delivered with fidelity during the follow-up co-taught lesson.
- Director will provide the Co-Teachers with feedback gained from the observation on the Foundations of Mathematics 1 co-taught lesson
- Director of Federal Programs will monitor and observe the Foundations of Mathematics 1 co-taught lesson to ensure fidelity of the process and academic growth is occurring for all students assigned to the co-taught classroom. Findings will be shared with the Co-Teachers for the purpose of making modifications to the co-taught lesson.
- Director will observe the co-taught Foundations of Mathematics 1 lesson once again to check for follow-through of suggestions made by the District Level Administrator.
- Director will collect copies of co-teaching Foundations of Mathematics 1 lesson plans for documentation.

- Director of Federal Programs will collect copies of the co-teaching lesson plans for the purpose of monitoring the Co-Teachers roles during the lesson and for evidence of collaborative planning. A copy of the co-teacher lesson plans will be shared and discussed with the building level administrator at Hertford County High School.
- The Director will co-plan with the Co-Teachers to ensure their roles in the planning process are clear for a successful delivery of the Foundations of Mathematics 1 co-taught lesson.
- Director will make suggestions for improvement during the co-teaching lesson and observe for follow through to ensure fidelity of the delivery of the process and learning is occurring.
- Director of Federal Programs will observe a Foundation of Mathematics 1 co-teaching class for the purpose of follow-through of collaborative planning, delivery of co-teaching lesson and for the purpose of providing feedback after forty-five or ninety minutes of co-teacher planning.
- The director will provide the Co-Teachers with solutions and suggestions for enhancing the co-teaching through collaborative planning lesson after the observation. Findings will be shared with the building level administrator at Hertford County High School for the purpose of follow-up documentation, daily walk-throughs, upcoming observations, and for the successful delivery of the co-teaching through collaborative planning process.
- Director of Federal Programs will secure a copy of the Foundations of Mathematics 1 Benchmark Assessment Scores for the purpose of monitoring

growth after implementing the co-teaching through collaborative planning process at Hertford County High School. The scores will be compared with the Foundations of Mathematics 1 Benchmark Scores from the 2013-2014 and 2014-2015 school terms to see if co-teaching through collaborative planning process had a positive impact on student growth on the Foundations of Mathematics 1 Benchmark Assessment scores.

- The Director of Federal Programs will develop a focus group to get their perception of the process of improving co-teaching the through collaborative planning process at Hertford County High School.
- Director will make a decision in whether to modify, continue, or discontinue the co-teaching process in the Foundations of Mathematics 1 course at Hertford County High School.

If the small scale proof of concept study for co-teaching is found to be successful it will be delivered in another co-taught course. Director of Federal Programs will analyze the Foundations of Mathematics 1 Benchmark Assessment scores, for the purpose of student growth, and share the findings of with the Superintendent, Assistant Superintendent, Principal, and Co-Teachers at Hertford County High School. The Director will make the decision at this point to further deliver the co-teaching through collaborative planning process within the district based upon the Foundations of Mathematics 1 Benchmark 2016-2017 Assessment results.

The Plan, Do, Study, and Act Model is being implemented to demonstrate the impact of a small scale proof of concept study on co-teaching through collaborative planning process and its effect on the Foundations of Mathematics 1 Benchmark Assessment Scores at Hertford County High School. Langford (2010) insisted that when the nine sub stages of PDSA are

delivered with fidelity during an Improvement Science small scale proof of concept study, the following steps will produce positive outcomes:

- Understand the system and select a team.
- What are all the possibilities for problems or opportunities?
- How will all the possibilities be funneled to one?
- Define the problem.
- Clarify the terms.
- Study the current situation.
- What data are needed?
- How will the data be collected?
- How will the data be displayed?
- What is the prediction?
- Analyze the causes.
- What are the root causes?
- Select and develop a theory for improvement.
- How do you decide which strategy will work best?
- Implement the theory for improvement.
- How do you know which strategy will work best?
- Study the results, learn from them.
- Did it work?
- How do you know?
- Standardize the improvement.
- How will the improvements be institutionalized?

- Reflect and establish future plans.
- What happens next?
- Does this problem need more work?

In summary outcomes of co-teaching through collaborative planning process and its impact on student learning is dependent upon several factors according to the literature:

- The principal must buy-into the process and allot time for co-teaching through collaborative planning process.
- Staff development for the teacher is imperative to ensure the co-teaching through collaborative planning process is delivered with fidelity.
- Staff development for the principal is vital to ensure they know what to look for during classroom walk-throughs, delivery of co-teaching through collaborative planning process, and when implementing yearly observations.

Allotting 45 minutes per week or 90 minutes per month is crucial to ensure time for co-teaching through collaborative planning for a successful co-taught lesson (Gurgur & Uzner, 2011).

With the necessary targeted co-teaching through collaborative planning components in place research has shown a positive correlation for academic growth in reading and mathematics for students with disabilities (Bauwens et al., 1989).

Measure of Improvement

The continuation of the model will be contingent upon students with disabilities making growth on the Foundation of Mathematics 1 Benchmark assessment after receiving co-teaching through collaborative planning instruction from two certified teachers based on their strengths according to data and student needs based upon data gathered from assessment results.

Moreover, during the 2014-2015 school term no students met proficiency on the Benchmark assessment in the Foundations of Mathematics 1 course at Hertford County High School after receiving co-teaching through collaborative planning.

The Plan, Do, Study Cycle

The following paragraphs describe the Plan, Do, Study process (see Figure 1).

Plan

The objective for the measure of Improvement for this small scale proof of concept Organizational Improvement Project is to achieve growth in the Foundations of Mathematics 1 Benchmark assessment scores (see Figure 1). This process will occur during the 2016-2017 school year after co-teaching through collaborative planning in the Foundations of Mathematics 1 Course at Hertford County High School. Project Leader stated there is evidence of a problem with collaborative planning if only 10.6% of 31 special education students have met proficiency on the Foundations of Mathematics 1 End-of-Course Assessment during the 2013-2014 school year and 0% met proficiency during the 2014-2015 school year. Project Leader noted that forty Foundations of Mathematics 1 lesson plans have been collected by the school administrator but there is little evidence of collaboration within the 40 lesson plans. After collecting and reviewing 40 lesson plans that were obtained from the grade level administrator, it was evident that co-teaching through collaborative planning was not occurring in the course. Project Leader found that the exceptional children's teacher wasn't recognized once in the 40 lesson plans that were viewed. In addition, the special education co-teacher's name did not appear on the plans nor did the co-teacher have a role in the co-teaching through collaborative planning process. After meeting with the principal the Project Leader will schedule a meeting with the principal, general

(1) PLAN

Questions. What questions do you have about what will happen?	Predictions. What do you think might happen as a result of this change?	Data. Data you'll collect to test predictions.
(Q1) Will Effective Co-Teaching Take Place	Benchmark Scores will Improve	Benchmark Scores

(2) DO

Briefly describe what happened during the small scale study: surprises, difficulty getting data, obstacles, successes, ect.

(2) STUDY

Record results from the small scale proof of concept study. Use of measures (i.e., the data identified in the PLAN phase) based on your predictions. How do measures compare to your predictions?
(Q1)

(3) ACT

What will you do next? Describe modifications/ decisions for the next cycle.

Figure 1. PDSA Cycle.

educator, and special educator to discuss the co-teaching through collaborative planning process. Project Leader will ensure forty-five minutes per week or ninety minutes per month of co-teaching through collaborative planning time are being used for planning. Project Leader will ensure that the general educator and special educator come together for forty-five minutes during the week to co-plan. Project Leader stated that teachers will plan together to determine the section of the course they will teach during the week based upon teachers' strengths and students' needs according to assessment data results. Project Leader will ensure that team planning minutes are developed and gathered after the co-teaching through collaborative planning process meeting. Project Leader will ensure that a process for monitoring the delivery of the co-teaching lesson is agreed upon by the Project Leader, principal, general education and special education teacher. Project Leader will document areas needing improvement during the co-teaching lesson observation. Project Leader will provide feedback to the Co-Teachers on the findings from the co-teaching observation. Project Leader will observe another co-teaching lesson to look for suggested recommendations made from the previous co-teaching observation. Project Leader will implement a follow-up observation to ensure that suggestions made from the previous lesson are being implemented during the follow-up co-taught lesson.

Do

Project Leader will secure a copy of the Foundations of Mathematics 1 Benchmark Assessment scores for the purpose of monitoring growth and proficiency after implementing the co-teaching through collaborative planning process at Hertford County High School. The general educator and special educator will come together for forty-five minutes during the week to co-plan for the Foundations of Mathematics 1 course. Project Leader will ensure that 45 minutes per week or 90 minutes per month are allotted for collaborative co-planning. Project Leader will

ensure that Co-Teachers collaboratively co- plan together to determine the section of the course they will teach for the week based upon teachers' strengths and student's needs according to assessment data results. Project Leader will co-plan with the Co-Teachers to ensure their roles in the planning process are clear for a successful implementation of the Foundations of Mathematics 1 co-taught lesson. Project Leader will observe another co-teaching lesson to look for suggested recommendations made from the previous co-teaching observation. Project Leader will share findings from co-teaching observations with Co-Teachers for the purpose of making modifications to the co-taught lesson.

Study

Project Leader will secure a copy of the 2016-2017 Foundations of Mathematics 1 Benchmark Assessment scores for the purpose of determining growth after implementing the co-teaching through collaborative planning process at Hertford County High School. Project Leader will analyze the Foundations of Mathematic 1 Benchmark Assessment scores and share the findings of with the Superintendent, Assistant Superintendent, Principal, and Co-Teachers at Hertford County High School. Project Leader will make a decision in whether to modify, continue, or discontinue the co-teaching through collaborative planning process after analyzing student results in the Foundations of Mathematics 1 course at Hertford County High School. The Project Leader will make the decision at this point to further implement the co-teaching through collaborative planning process within the district based upon the Foundations of Mathematics 1 Benchmark 2016-2017 Assessment results, observations of lesson plans, classroom observations, and delivery of co-teaching through collaborative lesson planning process.

Act

Project Leader will secure a copy of the Foundations of Mathematics Benchmark Assessment scores for the purpose of measuring growth after implementing the co-teaching through collaborative planning process at Hertford County High School. Project Leader will compare the Foundations of Mathematics 1 Benchmark assessment scores from the 2013-2014 and 2014-2015 school terms to see if co-teaching through collaborative planning process had a positive impact on the 2016-2017 Foundations of Mathematics 1 Assessment scores. Project Leader will analyze the Foundations of Mathematics 1 Benchmark Assessment scores and share the findings with the Superintendent, Assistant Superintendent, Principal, and Co-Teachers at Hertford County High School. Project Leader will study the effects of the questions and strategies utilized to address the impact of the professional development and training of the Co-Teachers and administrators to determine if they have developed the skills and knowledge to effectively deliver co-teaching through collaborative planning process. Project Leader will make the decision at this point to further deliver the co-teaching through collaborative planning process within the district based upon the 2016-2017 Foundations of Mathematics 1 Benchmark Assessment results and observations of lesson plans, classroom observations and delivery of co-teaching through collaborative planning process. Questions to be answered at the completions of the PDSA process and strategies to address questions:

- Was there an increase in Benchmark Assessment Scores?
- Project Leader will analyze data gained from 2016-2017 Foundations of Mathematics 1 Benchmark Assessment Scores to determined growth.
- Were the teachers comfortable with the co-teaching through collaborative planning process?

- Co-Teachers would be able to consistently deliver the co-teaching through collaborative planning process with fidelity after receiving adequate training.
- Co-Teachers taught content consistently with fidelity based upon teachers' strengths and students needs according to data results upon receiving the appropriate feedback from the Project Leader.
- Co-Teachers consistently co-planned for 45 minutes per week to enhance students' growth.
- Co-Teachers consistently divided the lesson equally during co-planning to maximize learning and to ensure mastery of content taught.
- Co-Teachers consistently played an active role in the instructional process to ensure positive learning results.
- Did the teachers feel the supplemental in-service was beneficial?
- EC Teacher provided teaching strategies that benefited both EC and Regular Education students during the co-taught lesson after receiving adequate training.
- Co-Teachers implemented a co-taught lesson using one of the six co-teaching processes with fidelity after receiving adequate training.
- Co-Teachers had all of the necessary supports in place to ensure all components were clear in the co-teaching through collaborative planning process to ensure learning after receiving adequate training.
- Co-Teachers implemented the feedback and suggestions provided by the Project Leader to make the lesson better which was evident by active student participation.

- Did the Principal feel his role during the process was clearly defined?
- Principal allotted 45 minutes per week in the school schedule for Co-Teachers to co-plan after meeting with the Project Leader.
- Principal used the information gained from the Project Leader's meetings to implement walk-throughs, for classroom observations and to provide Co-Teachers with the feedback necessary to ensure fidelity of the co-teaching through collaborative planning process.
- Principal used information gained from the introductory meeting with the Project Leader to monitor delivery of the program and to provide Co-Teachers with the necessary corrective feedback to ensure possible changes within the co-teaching through collaborative planning process.
- Principal made time available within his schedule to co-plan with the Co-Teachers and to provide the necessary feedback on the best process to implement during the co-teaching through collaborative planning process for mastery of the content taught.

CHAPTER 4: RESULTS FROM THE IMPROVING CO-TEACHING THROUGH COLLABORATIVE PLANNING STUDY

The following is a description of the process and tasks that were initiated and achieved in completing the Improving Co-Teaching through Collaborative Planning. The Project Leader scheduled an Informational Meeting with the Principal and Co-Teachers at Hertford County High School on April 4, 2017 to discuss the process for implementing a Problem of Practice Study on Improving Co-Teaching through a Collaborative Planning Process in the Foundations of Mathematics 1 Course. At the conclusion of the meeting with the Principal, the Project Leader scheduled a time to meet with the General Educator and the Special Educator as a team to discuss the Improving Co-Teaching through Collaborative Planning project. As a result of this meeting the team agreed upon a time to meet and discuss the process and procedures for implementing the project. During the meeting on April 5, 2017 the Principal, Grade Level Administrator, and Co-Teachers informed the Project Leader that they did not have a collaborative planning period, nor did they assign co-teaching content delivery based upon assessment data results or students' needs during a co-taught lesson. It was also discovered during this meeting that the General Educator did collaborate with the Special Educator on the majority of the teaching. The Special Educator was the manager of the classroom resources and primarily assisted students with staying on task in the Foundation of Mathematics 1 Course.

The meeting concluded with the designation of Tuesday's from 3:15pm until 4:05pm being the designated time set aside each week for the Co-Teachers to plan collaboratively for the Foundations of Math 1 course. During the meeting the Co-Teachers did agree to teach based upon their strengths and students needs according to the data obtained from the Pearson's Schoolnet Instructional Improvement System (IIS) which is an all-in-one solution designed to

drive data informed decisions to improve learning. Moreover, Schoolnet (IIS) empowers educators to deploy a standards based curriculum to ensure consistent and rigorous instruction and to administer formative assessments to help identify student needs more quickly. As a result, due to the number of students not meeting proficiency in the past on their Math Benchmark Assessment, the District has decided to allot \$2,900 dollars from its Title 1 Funding annually for the purpose of purchasing a Schoolnet license for each student enrolled in the district.

Co-Teachers Responses from the Co-Teaching through Collaborative Planning Process Survey

The survey was administered to the General Education and Special Education Co-Teachers assigned to the Foundation of Mathematics 1 Course at Hertford County High School for the purpose of obtaining their perspective on Co-Teaching and Co-Planning. The following results of the survey are provided to illuminate and document the status of collaboration and planning in the Mathematics 1 Course at the initiation of the project (see Table 1).

Survey Results

As can be seen in the survey results the Regular Classroom teacher had clearly assumed the dominant teaching role in the Math1 classroom with the Special Educator's role could be described as subordinate to nonresistant. It is important to note that this situation was not attributed to any conflict or disagreement between the two education professionals but essentially the way that all parties assumed things should be.

In the next portion of the Results Section, selective excerpts of the interactions between the Collaborative Teaching Team and the Project Coordinator will be provided. The purpose of these excerpts is to provide the reader with a sense of the progress of the improvement process and details and nuance of the interactions of the players involved in the project.

Table 1

Survey Results

Questions	Rarely	Sometimes	Usually	Always
I often present lessons in the co-taught class.		Special Educator		General Educator
I feel confident in my knowledge of curriculum content.		Special Educator		General Educator
Time is allotted (or found) for common planning.		General Educator and Special Educator		
Planning can be spontaneous with changes occurring during the instructional lesson.		General Educator and Special Educator		
The administration encourages and supports both teachers and co-teaching.				General Educator and Special Educator
Students accept both teachers as equal partners in the learning process			General Educator and Special Educator	
I feel happy about my relationship with my co-teacher.				General Educator and Special Educator
We hold meetings and give honest feedback about lessons.			General Educator and Special Educator	

Selective Excerpts of Meetings, Lessons, and Actions

During the Collaboration Process

First Co-Teaching through Collaborative Planning Session

The first co-teaching through collaborative planning session was implemented at Hertford County High School on April 11, 2017 at 3:15pm in the General Educator's classroom. The General Educator and the Special Educator collaborated to determine what co-teacher was going to implement which section of the exponential functions activity during the co-taught lesson. The General Educator communicated that the math lesson operates on a ninety minute block of time daily. The Project Leader probed to ascertain which section of the exponential function activity that the Exceptional Children's Teacher would be delivering within the lesson. The General Educator stated that she felt comfortable with the Exceptional Children's Co-Teacher presenting the daily warm-up activity, which is comprised of two exponential word problems and she would also lead the morning board work activity which would permit students to solve problems on the board and explain how they arrived at their answers to the exponential function math problems. Furthermore, the Exceptional Children's Co-Teacher would demonstrate at the board the process for solving an exponential word problem and explain the process step by step for deriving at the correct answer to the problem. Next, the General Educator would present the curriculum content for the exponent equations activity since this would constitute a new curriculum concept. In addition, she would provide the basic foundation for the math lesson. The Exceptional Children's Co-Teacher would be allotted ten minutes to deliver the guided practice activity on the exponential math activity.

As a result of this planning session, the General Educator and the Special Educator would be implementing the Team Teaching Model as coequal collaborators for the guided practice

activity during the exponential function lesson. The Exceptional Children's Co-Teacher was selected during the co-planning process to demonstrate the more straight forward processes and strategies for solving the exponential problems during the math activity. The General Educator communicated to the Project Leader during the co-planning session that she feared the concepts for which she was responsible might be the least understood at the conclusion the exponential function activity. After reviewing a prior lesson plan the recommendation was made by the Project Leader during the Co-Teacher planning meeting to have the Exceptional Children's Co-Teacher's name added to the co-teaching plan so that the plan would reflect the content that she would be delivering during the exponential activity. The General Educator communicated to the Project Leader that she had not executed that method for co-planning during previous years. Consequently the Project Leader stated during the co-planning meeting that she wanted to see documented in the co-teaching plans exactly where the Exceptional Children's Co-Teacher and the General Educator would be instructing students during the delivery of the exponential function co- teaching lesson.

As a result, the Project Leader secured a copy of the co-teaching plan to examine it for collaborative planning and delivery of the content during the exponential function co-taught lesson. The co-planning meeting concluded with the Project Leader receiving a copy of the co-teaching lesson plan from the initial co-teaching through collaborative planning meeting and it was made evident at that time that the Exceptional Children's Co-Teacher's name was not included on the co- teaching lesson plan. However, the Project Leader made the recommendation at that time to have to Exceptional Children's Co-Teacher's name included on the second co-teaching lesson plan and to insure that the plan reflected which section of the co-taught lesson that each teacher would be deliver during the exponential function activity.

The Project Leader received a copy of the Foundations of Math 1 Benchmark scores from first semester 2016. The scores obtained would be utilized at the conclusion of the study to determine if, co-teaching through collaborative planning had an impact on student growth on the second Benchmark Assessment results that would be administered on May 10, 2017.

First Co-Teaching Observation Performed by the Project Leader

The General Educator started the class by introducing the classroom expectations for the new semester in the Foundations of Math 1 Course and quickly transitioned into the warm-up activity. Next, the General Educator presented the Bell Ringer and had students write $2+2+2+2+2$ in exponential form. Then, she inquired what is one way that you could have explained (27) in exponential form? The Exceptional Children's Co-Teacher entered the classroom at 11:23 and she informed the students that she would be providing them with a few more minutes to solve the exponential problem that was on the board. Then, she selected a student to go to the board and solve the exponential math problem. In fact, she explained to the class how the student at the board had arrived at the correct answer to the exponential math problem. Then, the Exceptional Children's Co-Teacher inquired was everyone able to come up with the number two for the answer? Next, the Exceptional Children's Co-Teacher demonstrated for the students the process that was implemented in solving problem number two on the board. She stated that three was to the third power in the math exponential problem.

Next, the General Educator passed out pop icicle sticks and the math groups were formed based upon the color of their icicle sticks. As a result, the General Educator set the tone for students' behavior and provided the content for the exponential function math lesson. She provided the procedures and directions for solving the exponential function math problems. The General Educator inquired what is the mathematical term for $2x = 8$? Then, she inquired what

does the (x) represent in the exponential function? “A student”, verbalized, “a variable”. As a result, the General Educator provided the basic foundation for solving an exponential function and for finding the base of a problem. Then, the Exceptional Children’s Co-Teacher chimed in to explain the semantics of the term base while the General Educator was at the board. The Exceptional Children’s Co-Teacher explained to the students that you must use the lowest common factor to come up with the base of $8x=16$ of an exponential function. Then, she passed out envelopes for the exponential function activity. Both the General Educator and the Exceptional Children’s Co-Teacher circulated in the classroom monitoring and assisting students as they worked on group activities. The students were instructed by the General Education Co-Teacher to separate the cards into three correct stacks. Next, the General Educator informed the students that there should be seven cards in each row and both Co-Teachers continued circulating during the math exponential lesson. The General Educator called upon a student to explain how he arrived at the answer to the math problem. The student stated if the numbers looked identical they belonged in the same category. Then, the General Educator communicated to the students if the pieces were cut the same length they would also be categorized together in the activity. The General Educator communicated to the students that each team would have to select a presenter for their group. She communicated to the students that your base would never be larger than the smallest number that you would encounter in an exponential function equation. As a result, the General Educator directed the students to use the calculator as a checking device for the exponential math activity. Moreover, the General Educator and the Exceptional Children’s Educator continued to circulate assisting students as needed during the exponential math activity. The General Educator provided the students with a mnemonic strategy for solving the exponential function problems that were written on the board. In addition, the Exceptional

Children's Co-Teacher went to the board and demonstrated for the students how to solve an exponential function problem implementing the least common factor. She asked the students did they know how to solve the problem now and a student said no! So she explained the exponential function again at a much slower pace implementing a different procedure for arriving at the answer to the problem. The General Educator selected a student from each group to go to the board to solve and explain an assigned exponential math problem. However, the Exceptional Children's Co-Teacher questioned a student that was at the board to find out where the (X) had derived from in the math function problem that she was solving. Then, the students were instructed by the Exceptional Children's Co-Teacher to copy the first math problem in their notebook since it was solved correctly by the student at the board, The General Educator encouraged the students to retain the terminology just as she had presented it to them, for the purpose of solving an exponential function problem. The General Educator acknowledged that the students were implementing the process that the Exceptional Children's Co-Teacher had taught them during the exponential function lesson for arriving at the answer to the math problem. However, the Exceptional Children's Co-Teacher had to leave class at 9:20 because a parent had requested a changed in her IEP Meeting time. Therefore, the General Educator went on to inform the students that the exponential function would change but the process would remain the same with all problems. She also communicated to the students that they could have used the following formula to solve the exponential function on the calculator by simply inputting the following steps; *math up, and enter* but she also pointed out that students you were going to have to solve the equations by working it out on paper because, the function key does not work for (y-1) but the formula would work for equations with whole numbers. The General Educator communicated to the Project Leader that the students were going to have to complete

an exit ticket to demonstrate how well they had comprehended the exponential function activity. The General Educator also communicated to the students that the ticket was not for a grade, she was just checking for the mastery of the concept that was taught today in class. She instructed the students to put their exit ticket responses on the small slip of paper that she had passed out earlier in class.

Synopsis of the Project Leader's Supportive Feedback from the First Co-Teaching through Collaborative Planning Observation

Exceptional Children's Co-Teacher's Recommendations from the Project Leader:

- Please ensure that all students are focused before you start explaining the concept that is on the board
- Try to be in class before it starts

Recommendations for the General Education Co-Teacher:

- Include Exceptional Children's Co-Teacher's name on the co-teaching lesson plan
- Identify the section in the co-teaching lesson plan that the Exceptional Children's Co-Teacher would be delivering during the math exponential function lesson

Second Co-Teaching through Collaborative Planning Classroom Observation

General Educator began the lesson by communicating to the students that today's class delivery method would be based upon the exit ticket responses received for the previous lesson. The Exceptional Children's Co-Teacher explained the procedures that the students could have utilized in solving the exponential function math problems on the board. Then, the General Educator asked the students what procedures could have been used in solving the exponential

function problem. Next, she inquired if there were any questions about the exponential math problems that were solved on the board. As a result, the Exceptional Children's Co-Teacher explained the second exponential function problem and the students echoed each step as the co-teacher solved the exponential math problems from the board. Then the Exceptional Children's Co-Teacher asked if there were any questions about the exponential problems that were solved on the board.

Next the Exceptional Children's Co-Teacher informed the students that they would be starting a new math lesson today in class. The General Educator began the lesson by showing a PowerPoint that would enhance the students exponential functions conceptual base as this was what the students stated that they wanted, based upon the findings from the survey administered by their Co-Teachers during the first class session. The General Educator began the lesson with a brief overview from the previous lesson on exponential function. The General Educator asked the students to provide her with two characteristics of an exponential function. Next, the Exception Children's Co-Teacher wrote the definitions for rate and variable on the board as the General Educator delivered the lesson. In fact, the General Educator communicated to the students in the class that rate meant that the exponential function was always increasing or decreasing. And, the General Educator requested everyone write down the math vocabulary from the board. The Exceptional Children's Co-Teacher noted that one student was still writing, then remarked that everyone had completed the exercise.

The General Educator provided the background knowledge on graphic equations during the co-taught lesson and she explained the process for solving an equation utilizing a graph. At the end of the presentation, the Exceptional Children's Co-Teacher demonstrated how to input the first equation into the calculator. The General Educator went to the board and communicated

to the students that she needed for everyone's attention to be on the board while she was delivering instruction. The General Educator delivered the majority of the instructing as the students were learning a new concept on graphing functions. The Exceptional Children's Co-Teacher circulated assisting students as needed during the delivery of instruction on the graphing function activity. The General Educator asked if there were any questions after the students had completed their graphing function activity.

The General Education Teacher communicated to the students that they would have to be able to provide an example of an exponential growth function and exponential decay function as their exit ticket for today. In closing, the General Educator informed the students that their homework would be due on Thursday, April 13, 2017 but she would accept the completed assignment earlier if they completed it sooner. The instructor stated the allowance of additional time to complete the homework assignment due to the feedback responses received from the survey that was administered on the first day of class.

The Project Leader was provided with a revised copy of the co-teaching lesson plan during the start of the meeting. The co-teaching lesson plan included both Co-Teachers names and the designated section of the equation graphing activity that each co-teacher would be delivering during the lesson. Also, during the Project Leader's meeting with the Co-Teachers, the General Educator communicated to the Exceptional Children's Co-Teacher some corrective feedback suggestions about what they could have done to make the delivery of the equation function lesson clearer for the students. The General Educator felt that she could have done a much better job with providing an explanation for graphing problems three and four on the activity sheet for the students in the Foundations of Math 1 Course.

Synopsis of Project Leader's First Follow-Up Conference with the Exceptional Children's Co-Teacher and General Education Co-Teacher

Later in the process, the Project Leader followed up with the teachers in the process. The following statements summarize her feedback to these teachers:

- Exceptional and General Education Co-Teachers both circulated assisting students as needed during the plotting activity.
- When the General Educator went to the board to explain the activity she ensured that she had every student's attention before she began solving the problem.
- General Educator and Exceptional Children's Co-Teacher collaboratively delivered the lesson and assisted students more during the graphing activity than during the previous the exponential functions activity.

Second Co-Planning Meeting with the Foundations of Math 1 Co-Teachers

The General Educator reminded the students that were assigned to the first and third blocks of the Foundations of Math 1 Course and that the Operations of polynomial test would be administered on Friday. The Exceptional Children's Co-Teacher would be presenting the Bell Ringer during the polynomial activity. The General Educator stated that co-teacher planning and delivery was going to be better this semester due to the forty-five minutes of collaborative planning. The General Educator provided the Project Leader a briefing on the ACT Test that would be administered on Tuesday, April 25, 2017. The Project Leader asked the Co-Teachers to provide her with an update on any impactful supportive feedback. Feedback provided was as follows:

- Co-Teachers communicated that they are seeing better student participation in class due to co-teaching.
- Students that were not previously on task in class are now focused and on task in class.
- General Educator feels that the students have a better attitude toward the Exceptional Children's Co- Teacher since she is leading instruction within the classroom.
- Students are now receptive to the Exceptional Children's Teacher instructing at the front of the classroom.
- Students are seeing the Exceptional Children's Co-Teacher as an equal and not as an assistant.
- Students weekly test scores have improved since co-teaching has been instituted in the Foundation of Math 1 Course.
- Students like the study guide that the Exceptional Children's Co-Teacher is generating for them to study with for their weekly math test.
- Exceptional Children's section for lesson delivery is visible in the Co-Teachers lesson plan.
- Exceptional Children's Co-Teacher will generate the math test based upon the exponent unit taught during the week.
- Exceptional Children's Co-Teacher has gained a stronger knowledge base in math academic vocabulary.
- Co-planning time has increased between the General Educator and the Exceptional Children's Teacher.

- Exceptional Children's Teacher is now permitted to grade math papers at the completion of a math activity.

First General Education Teacher's Perception of the Exceptional Children's Co-Teacher's Growth since the Introduction of the Co-Teaching Process

The teachers provided feedback to the Project Leader regarding their perceptions of the progress of the project. The following statements summarize their perceptions:

- Exceptional Children's Teacher has begun to generate study guides.
- Exceptional Children's Teacher presents the Bell Ringer without being directed to do so, which allows the General Education Teacher time to get the attendance done in a timely fashion.
- General Educator no longer feels that it is her duty to complete every task in the classroom.
- The co-teaching process has permitted the General Educator to relinquish some of her roles within the classroom and allowed the Exceptional Children's Co-Teacher to accept new roles within the classroom.
- Students now treat the Exceptional Children's Co-Teacher and the General Education Teacher as equals.
- When students raise their hand in class they sometimes inform the General Educator that they are waiting on the Exceptional Children's Co-Teacher to assist them with their question.
- The General Educator communicated that it is rewarding to have students trust in the Exceptional Children's Co-Teacher.

- The General Educator communicated that the Exceptional Children's Co-Teacher has found her voice within the classroom.
- The General Educator observed the Exceptional Children's Co-Teacher was mimicking her more within the classroom while delivering instruction to the students.
- The General Educator communicated that the Exceptional Children's Co-Teacher has the same rights as she does within the classroom.
- Exceptional Children's Co-Teacher can write a referral and send students to the office just as General Educator. This practice had not been followed in the past.

Fifth Co-Teaching Observation Feedback Meeting

Exceptional Children's Co-Teacher began the lesson with the Bell Ringer for the exponential function activity. Then, the Exceptional Children's Co-Teacher communicated to the students that they would be having a test on Friday. Next, General Education Co-Teacher took attendance and Exceptional Children's Co-Teacher called upon a student to read and solve the exponential function problem that was written on the board. The General Educator was circulating as the Exceptional Children's Co-Teacher inquired what do you have to do to change 18 months into a year? She asked the students to input the formulas on the board into their calculator to see if they came up with the same answers as she did for the math problems. The General Educator Co-Teacher made it evident to the Project Leader that the Bell Ringers were being generated from Schoolnet. In addition, the General Education Co-Teacher made it known during the observation that the students were required to change the formulas to an equation.

Next, the General Educator inquired who was a captain during the math activity on yesterday and then she asked if she had anyone that would like to assume the role of one of the group captains from yesterday? The General Educator communicated to the students that one side of the activity sheet is comprised of addition problems and the other side of the activity sheet is comprised of subtraction problems. She made it clear that the addition problems were easier to solve than the subtraction problems during her introduction of the activity. The General Educator made the suggestion that students complete a mixture of the exponential equations and try to focus on the ones that they saw as a deficit for them during the activity. During this time period, the Exceptional Children's Co-Teacher was working with an individual student that had not mastered the exponential function concept. The General Educator then began to circulate and monitor students' progress and time on task. She began to provide assistance to a student that was having difficulty with the exponential function activity. Students worked in groups and a captain was selected to lead each group during the exponential function activity. The General Educator informed students that the purpose of the math exponential function activity was to get a better understanding of the concept. Then the General Educator went to the board to assist a student with solving a math equation. The General Education Co-Teacher informed the students that a math captain does not know everything about equations they are just a support system for the team. As a result, the General Educator demonstrated for the Exceptional Children's Co-Teacher how she could utilize the calculator to solve an equation during the function equation activity. The General Educator explained that you have to input the word math, and then press enter twice. The Exceptional Children's Co-Teacher sought advice from the General Educator on how to solve the second part of the equation while the students were out to lunch. The General Educator informed the students when they returned from lunch, that they were doing a pretty

good job today with the exponential function activity and with staying on task. The Exceptional Children's Co-Teacher then assisted an exceptional student with the math review for the equation formula test on Friday. In addition, the General Education teacher asked the students, if she could show them one more strategy that could be utilized in solving exponentials. Then, the General Educator informed the students that it would be okay for them to draw lines on their paper to solve the exponent function, but you must begin drawing the lines from the highest exponent down to the lowest exponent if it starts at zero. The Exceptional Children's Co-Teacher and General Education Teacher continued to work with small groups or assist students one on one as needed during the math equation function activity.

The General Education Teacher communicated to the Project Leader that she is learning to give up dominating in the co-teaching setting. The General Educator stated that co-teaching might work this semester in the Foundations of Math 1 Course, and that the students in the co-teaching setting might just earn 3's and 4's on the Spring Benchmark Assessment due to the co-planning and co-teaching delivery process. As a result, the General Educator communicated to the Project Leader and the Exceptional Children's Co-Teacher that she had arranged the function activity in a manner that would make it easier for the students to learn to solve addition function equations.

Co-Teaching Follow-Up Observation

A student inquired if the Exceptional Children's Co-Teacher was at school today, because she had not arrived before the third period bell had rung. The Exceptional Children's Co-Teacher finally arrived in the class and she was quickly called upon a student to read the Bell Ringer. In addition she inquired who would like to come to the board and solve this equation problem. As a result, a student in the class asked the Exceptional Children's Co-Teacher, if they

were going to check math binders tomorrow. Then, the Exceptional Children's Co-Teacher went on to explain the math equation problem on the board and asked if there were any questions about any of the problems that were covered in class. Next, the General Education Co-Teacher made the statement that there is something not quite right about the equation that is written on the board. In fact, the General Educator directed the students in the class to focus on the problem $(100(0.9)^{281})$ that was written on the board to ensure it was copied and pasted correctly.

The General Educator instructed the students to utilize this problem to make a prediction and determine if this math problem made sense in the way that it was written on the board. Then the, General Educator asked about the test to be given the following day.

The General Educator suggested to the students that they work in three small groups due to the number of students that were absent. The General Education Co-Teacher made it evident to the students in the class that the test was going to be aligned with the study guide, and that the Exceptional Children's Co-Teacher and General Educator would be working with individual groups of students on an as needed basis, if they did not understand a concept that was on the activity sheet. The Exceptional Children's Co-Teacher and General Education Teachers continued to work in small groups with students in completing the function activity study guide which was designed to prepare them for Friday's equation function test.

The Co-Teachers implemented the parallel co-teaching process in the Foundation of Math 1 Course. As a result, they rotated to and from small groups of students as needed assisting them with the math exponential function study guide activity.

The Grade Level Administrator performed a walk-through to observe the co-teaching lesson on exponential function. The Administrator observed for fifteen minutes and left the classroom.

Next, the General Educator informed the students that they did not have to worry about coming up with a perfect square for solving the equation. Then, the General Educator communicated to the students that the only way that they could retake the bi-weekly test on equations was that they had to earn a score of 50 or better on the assessment.

Third Project Leader and Co-Teachers Collaborative Planning Meeting

The Exceptional Children's Co-Teacher suggested they initiate the lesson with a Bell Ringer on graphing exponential functions. She planned have a student present the Bell Ringer orally in class once everyone had finished solving the problem. The General Educator stated that based upon the lesson plans they were running a little behind in their lesson plans schedule. The General Educator stated that what they would be doing tomorrow in the course was similar to a math lab on graphing. The General Educator and the Special Educator would be collaboratively facilitating the graphing function activity during the co-taught lesson. As a result, students would be using the red, green, and yellow cards to determine who needed assistance during the graph function activity. To sum it up, the Project Leader asked the General Educator what did she think was the most impactful activities during the co-teaching through collaborative planning process in the Foundations of Math 1 Course at Hertford County High School. A summation of their thoughts on this question follows:

- Exceptional Children's Teacher is presenting the Bell Ringer and the General Educator has seen growth in her performance since the initial co-teaching and co-planning follow-up meeting.
- Exceptional Children's Co-Teacher is now assisting with off task behavior while the General Educator is delivering instruction at the board.

- Exceptional Children's Co-Teacher is speaking up more in class during the delivery of the co-teaching process.
- Exceptional Children's Co-Teacher is being accepted more now as an equal teaching partner in the class by the students in the co-teaching setting
- General Education Teacher feels that the students in the class would prefer to have the Exceptional Children's Teacher as lead teacher for the course instead of her.
- General Education Teacher feels that the students are accepting the Exceptional Children's Co-Teacher more now, because at first they didn't feel that she had a grasp on the Foundation of Math 1 Curriculum.
- Exceptional Children's Co-Teacher shares more information now during the Co-Planning Process.

As a result, the Exceptional Children's Co-Teacher communicated to the Project Leader that she feels more confident about herself as a co-teacher and is better prepared for the students in the Foundations of Math 1 course due to the forty- five minutes of co-planning per week. Moreover, she feels more confident about presenting in class now because at one point she was learning the curriculum along with the students. In response to this feedback from the Exceptional Children's Teacher, the Project Leader provided the following support:

- General Educator specified that the Exceptional Children's Teacher is becoming more independent now in the co-teaching environment and she has begun to assemble resources before she arrives to class for the purpose of enhancing the lesson, however, she is continuing to maximize this skill.

- General Education Co-Teacher revealed that she used to plan in isolation in advance for the Foundation of Math 1 Course but now she waits and collaboratively plans along with the Exceptional Children's Co-Teacher.
- General Educator expressed that she is going to start allowing the Exceptional Children's Co-Teacher to create one activity per week to accompany the unit that they are co-teaching for the week, but the General Educator communicated that she still wants to view the activity before she assigns it to the students.
- General Educator is going to permit the Exceptional Children's Co-Teacher to generate the next Schoolnet test for the bi-weekly Foundation of Math 1 Assessment.
- Exceptional Children's Co-Teacher and the General Educator will collaboratively generate one paper and pencil test, and then generate a unit test which would in fact cover all of the materials taught on exponential function and graphs.
- Exceptional Children's Co-Teacher responded that you should teach the way that you test, so that the information would not look foreign to the students on the bi-weekly test.
- The General Educator created the first test for the unit on exponential function and the Exceptional Children's Co-Teacher has the responsibility of creating the second test based upon what was taught during the unit on exponential function.

- The General Educator said that she was receiving more homework now since she had allotted the students two additional days to complete an assignment. She made it known to the students that she would not be accepting any homework after the designated timeline in the Foundation of Math 1 Course.
- Exceptional Children's Co-Teacher required students to create a notebook for the purpose of monitoring who was turning in assignments for the Foundation of Math 1 Course.
- Exceptional Children's Co-Teacher and General Educator commented that you could not distinguish which students were Exceptional in the co-taught classroom due to co-teaching and co-planning.
- General Educator and Exceptional Children's Co-Teacher revealed that they were actually getting comfortable with the co-teaching through collaborative planning process.

Project Leader asked the General Educator and the Exceptional Children's Co-Teachers what strategy or activity is currently working most effectively during the co-planning and co-teaching process. The Co-Teachers responded in the following manner:

- The Co-Teachers responded that when one co-teacher is at the board delivering instruction the other co-teacher is monitoring to ensure students are focused and on task for learning.

Fifth Co-Teaching through Collaborative Co-Planning Observation

The Exceptional Children's Co-Teacher directed students to have a seat after the bell had sounded for third period. She then directed their attention to the Bell Ringer on the board. The Exceptional Children Co-Teacher asked if everyone had completed the Bell Ringer. She then

stated that there would be a test on Friday and that she would be collecting notebooks at that time. The General Educator directed a group of students to continue working on the Bell Ringer. The Exceptional Children's Co-Teacher informed the students that they had one more minute to work on completing the Bell Ringer. The General Education Co-Teacher took the attendance and the Exceptional Children's Co-Teacher called upon a student to read the Bell Ringer. Then she asked if the function was a growth or a decay. The Exceptional Children's Co-Teacher read the word problem and asked what does the word appreciate mean and fielded responses. Next, the General Education Co-Teacher asked why the student implemented the variable (A) in solving the math problem? Then she asked why the students used the number 4? Next, the Exceptional Children's Co-Teacher explained the word problem step by step. She asked the students if they understood the concept and the students responded yes. As a result, the General Education Co-Teacher collected the homework assignments for the function activity. She then instructed the students to pick-up a math lab sheet that was located on the table near the door and explained they could utilize their notebook for support during the math lab activity. The General Educator informed the students again that they had cups on their desk and that they knew the purpose for the cups. In addition, she informed the students that she and the Exceptional Children's Co-Teacher would come to their group to assist them with the activity as needed. Problems developed with student attention and time on task during the latter portion of the class. The Teacher Collaborators attended to the problem in real time and then conferred about the behavior and attention problems as the students continued to work in groups.

It was determined that part of the problem was that the students did not fully comprehend some of the concepts they had been taught and did not completely understand how to proceed with the teaching strategies they had just received. After conferring the Collaborators decided to

reiterate both the concepts and the strategies. When discussing this situation with the Project Leader the Collaborators emphasized that the ability to confer with a colleague was a great aid in dealing with a difficult teaching situation and also helped the students continue their work as an effective group.

Recommendations for Improvement

The Project Leader provided the following emphasis as the project proceeded:

- The Exceptional Children's Co-Teacher needs to provide more assistance with keeping students on task when the General Education Co-Teacher is at the board delivering instruction.

Fifth Co-Teaching and Co-Planning Collaborative Meeting with Project Leader

During the weekly meeting it was decided that the Exceptional Children's Co-Teacher would implement the Bell Ringer for the multiplying polynomial activity. The Exceptional Children's Co-Teacher and General Education Co-Teacher would collaboratively facilitate the polynomial activity during the class session. The General Education Co-Teacher would introduce the curriculum concepts during the lesson. However, the Exceptional Children's Co-Teacher and the General Education Co-Teacher would collaboratively implement the closure for the polynomial activity which would consist of the following:

- Solving a polynomial problem to check for mastery of the concept taught.
- Summarizing what the Co-Teachers had taught to check for mastery.
- Completing an exit ticket that was designed by the Co-Teachers on the concept that was taught in class.
- Holding the groups accountable for solving a problem to perceive how well they collaborated as a team in solving the polynomial.

The Co-Teachers viewed themselves as implementing the Parallel and Team Teaching model for delivering the co-teaching lesson. In addition, as an idea would come to the Co-Teachers during the lesson, they would chime in and share it during the delivery of the co-taught math lesson. The Co-Teachers identified their collaboration as sporadic because they would chime in during an activity when a teachable moment occurred.

What has Improved due to Collaborative Co-Planning and Co-Teaching in the Foundation of Math 1 Course?

The Project Leader encouraged the teachers with the following feedback as improvement was noted in the project:

- Co-taught students are feeling more comfortable with the instructional support provided by the Exceptional Children's Co-Teacher.
- Co-Teachers now use captains to provide instructional support during the small group activities in math class.

What do the Co-Teachers Feel that They Need to Improve Upon within the Collaborative Co-Planning and Co-Teaching Setting?

The Project Leader suggested the following improvements:

- Co-Teachers are working on building the students confidence level within the co-teaching setting.
- The Co-Teachers realized that students enrolled in the co-taught setting are not intrinsically motivated to want to learn math unless the Co-Teachers are within close proximity providing support during the delivery of the content.
- The Co-Teachers are attempting to get co-taught students to retain the content delivered by Co-Teachers from one day to the next in class.

- The General Education Co-Teacher acknowledged that seventy-five percent of the students in the class will not work independently and this is why the groups are effective. The General Education Co-Teacher stated the students appeared to be afraid to try some activities independently.

Suggestions Provided by the Project Leader

The Project Leader suggested the following improvements:

- Provide the students with some study skill strategies, counseling, and mnemonic devices for building retention, motivation, and self-concept.
- Fully implement the Bell Ringer to enhance motivation and provide as much positive praise as possible when a student solves the math problems correctly.
- Encourage students to work as captains in the group. This strategy will enhance their leadership skills and confidence level and improve the willingness to work independently.

Seventh Collaborative Co-Teaching and Co-Planning Follow through Observation

The Exceptional Children's Co-Teacher dealt with some minor behavioral issues at the beginning of class. She was backed by the General Education Teacher and order was quickly restored. The General Education Co-Teacher urged the students to complete the five minute check and told the students they should not be talking during the warm-up. The Exceptional Children's Co-Teacher asked for someone to attempt the first problem. Would someone like to attempt this problem. Several students said simultaneously, "no". Then the Exceptional Children's Co-Teacher explained to the students that you began solving the problem with a square when multiplying an equation polynomial. Next, the Exceptional Children's Co-Teacher proceeded to explain the procedures for solving a polynomial. The Exceptional Children's Co-

Teacher then paused for a moment to allow students time to get a calculator for the purpose of solving the polynomial math problems. The Exceptional Children's Co-Teacher asked if everyone had a calculator. Finally, she redirected all of the students' attention back to the board, as she and the student at the board worked collaboratively in solving the polynomial math problem. The Exceptional Children's Co-Teacher asked if they all understood how to solve the polynomial. She then instructed the students to write the problem on their paper. Next, she informed the students that they had implemented the box method for solving the polynomial math problems. Then, the Exceptional Children's Co-Teacher asked if everyone had the problem written down. Next, the Exceptional Children's Co-Teacher reviewed the Bell Ringer from the day before. The Exceptional Children's Co-Teacher called upon a student and asked about the procedures for solving the polynomial math problem located on the board? The students then went through all of the procedures for solving the polynomial math problem. One student yelled out, "do not erase that problem, I need to finish copying it off of the board". As a result, the Exceptional Children's Co-Teacher asked if everyone had everything copied from the board. The General Education Co-Teacher informed the students that their activity for today was on multiplying polynomials. She said they would solve some problems before they went to lunch. The General Education Co-Teacher stated that some of the students did not have an understanding of the concept that was taught yesterday concerning polynomial's based upon the scores from papers she had reviewed after the class quiz. The General Education Co-Teacher asked the students to provide her with a polynomial that they would like for her to solve from their activity sheet. She stated that some students did not provide any evidence of how they arrived at their answers to the problems during the quiz. The General Education Co-Teacher explained to the students during the overview of the polynomial lesson that they were going to be

multiplying during the polynomials lesson and that all four of the boxes should contain an answer once the activity was completed. She inquired how do you know when I am going to implement a (3a) and a (2a)? Then she made this statement to the students, “if you watch me solve the problems long enough, you would be able to solve a polynomial.” Next, she informed the students that the similar terms in a polynomial problem would always be in the bottom left and the top right of the boxes. She then reminded the students that they must remember her slogan in order to solve a polynomial, “the problem would be different but the process would be the same when solving a polynomial.” The General Education Co-Teacher was called out of the room by a staff member and the Exceptional Children’s Co-Teacher went to the board and continued solving the four square polynomial. She wrote problem number nine on the board and stated we are multiplying in order to solve this problem. The General Education Co-Teacher directed students to return to their seats so that they could complete problem number nine. General Education Co-Teacher returned and called upon a student to give the procedures for solving polynomial number nine math equation on the board. She inquired what does the square require me to do in order to solve the polynomial? Then, the General Education Co-Teacher asked the students, “Why did I write the exponent twice on the board during the math activity?” She directed the students to give her some more polynomials to solve and she wrote the formulas for the problems on the board and provided students with a step by step process for solving the polynomials. Then, she informed the students that they have everything that they needed to solve the problems with their calculator. Next, she told the students that all you have to be able to do is remember how to input the formula into your calculator in order to be able to solve the polynomial.

The General Education Co-Teacher made the students aware of the three types of polynomials that they would need to know and be able to solve in order to complete their math project. Next, she reminded the students that this is not your assignment for today but, both of the activity sheets that you just received are necessary in order to complete your homework project. She made it evident that the project would require them to do some coloring and multiplying in order for them to be successful in completing it. The General Education Co-Teacher read the directions orally and then asked the students to locate the number one on their activity sheet. She inquired how did I arrive at finding the answers for problems two and three on the activity sheet? She stressed that it was the same way they did problem number one on the board. The General Education Co-Teacher informed the students that you have to color every number one the same color on the project activity sheet. Next, she asked the students what does the word different mean? Students responded with correct information. Then she commented when you bring your project sheets back on polynomials both sheets should be colored in order to be scored. She informed the students that a late project would not be accepted for the math polynomial activity. It was also made evident by the Co-Teachers to the students that, if they completed their project tonight that they would accept it tomorrow when the students arrived in class. She also reminded the students that various situations might emerge to keep the students from completing the project while they were at home. And finally, the General Education Co-Teacher asked the students to put their projects away at this time. However, she made it clear that she was requiring the students in her Foundation of Math 1 Class to maintain a notebook for this semester as a support resource for their future Mathematics Courses. Therefore, she directed the students again to go ahead and put up their projects.

The General Education Co-Teacher communicated to the students that they were going to work in pairs for this polynomial assignment. Then, she communicated to the students what she wanted them to complete on the activity sheet. Next, she instructed the students to find the shape similar to the one located on their activity sheet. Then, she directed the students' to paste it on top of the exact shape as seen on their activity sheet. Finally, she instructed the students to start working around the squares and parenthesis on their activity sheets and to glue the shape down once they had identified the exact shape seen on their activity sheet.

The General Education Co-Teacher made it clear that every student in the group should be working and thinking instead of calling upon her or the Exceptional Children's Co-Teacher to provide assistance for every question that arose during the polynomial activity. In closing the Exceptional Children's Co-Teacher assisted a group of five students during the polynomial activity and the General Education Co-Teacher circulated assisting students as needed.

Strengths Identified by the Project Leader during the Seventh Co-Teaching Observation

As additional encouragement, the Project Leader provided the following feedback to the teachers in the project:

- students were directed to focus their attention on the board and co-teacher during the delivery of the polynomial activity.
- when the General Education Co-Teacher was called into the hallway by a staff member the Exceptional Children's Co-Teacher stepped up to the board and continued on with explaining and solving the polynomial math problem.
- the Exceptional Children's Co-Teacher graded some math papers during her lunch period to get an idea of where the students' deficits and strengths were in solving polynomials.

Seventh Co-Planning Meeting

Students were told to complete an introductory activity on graphing quadratic equations. As a result, the students will be required to complete a cutting and pasting activity sheet on graphing quadratic equations. The Exceptional Children's Co-Teacher will be present the Bell Ringer and the General Education Co-Teacher will present the content section of the lesson on graphing quadratic equations. Both Co-Teachers will be present the vocabulary and strategies for the graphing quadratic equations lesson.

A student will be selected to go to the board to solve a graphing quadratic equation problem and explain to the class how he/she arrived at the correct answer to the problem. Then, students will be assigned to groups based upon whom they could work with and stay on task during the duration of the graphing quadratic equation activity.

The Co-Teachers will be delivering instruction based upon their strengths and their comfort level according to the data results obtained from Schoolnet. At the close of the co-planning meeting the Project Leader received a copy of the lesson plan which reflected that the Exceptional Children's Co-Teacher would be delivering the Bell Ringer, some of the academic math vocabulary and strategies for enhancing learning during the graphing quadratic equation lesson.

The General Education Co-Teacher stated that she would be implementing the core curriculum for the graphing quadratic equation lesson. She communicated in the co-planning meeting that I would be observing some Team Teaching and Parallel Teaching during my co-teaching observation.

Ninth Co-Planning and Teaching Observation

General Education Co-Teacher assigned students to their groups based upon whom they could work with collaboratively during the duration of the graphing quadratic equation activity. The General Education Co-Teacher communicated to the students that tomorrow everyone would be assigned to a team, but for today they would have four problems to solve as independent practice. The next day they would have twelve problems to complete as a team. The General Education Co-Teacher stated that everyone would need to pay attention so they could learn how to solve the equation problems.

Then, she asked the students to draw a candle that represented a burning candle. Next, she inquired how many different graphs they had been exposed to in class today? The students correctly stated four. The General Education Co-Teacher called upon a student to read problem number one orally. The General Education Co-Teacher communicated to the students that they would need to know how to label the X and Y axis by length and height for the graphing quadratic equation unit. Then the General Education Co-Teacher asked the students how much of the candle would burn in an hour. The students responded one inch. She then asked how much of the candle would burn in six hours and the students correctly responded six inches. Then, she instructed the students to copy the problem down so that they would have a model to go by for homework.

The General Education Co-Teacher directed the students to read problem (B) silently. Then she said, I know right now that you cannot give me 100% of the correct answers to the graphing activity because, what I am teaching you to do today in class, is what you would need to know in order to earn a 100% on the graphing quadratic activity. You only know how to do 90% of the graphing quadratic equation activity during this phase of the class.

A student was selected to read question number *Two* orally in class. The General Education Co-Teacher communicated to the students that in problem *Two* you must be able to tell me how much it would cost to mail a letter based upon the weight in ounces. Then, she demonstrated on the board how to weigh a letter and next she showed the students how to graph it. The Exceptional Children's Co-Teacher was assisting a student with the graphing quadratic equation activity individually.

Then the General Education Co-Teacher asked, "Why is this equation called a *step function*?" A student responded, "Because it looks just like a step". So, she provided an example of an open circle and a closed circle on the board. Then, she stated that it would go from an open circle to a closed circle and that an open circle meant that the letter did not weigh anything but a closed circle would tell you where you would need to start weighing the letter for postage. In addition, she responded that you would always start with an open circle then move to a closed circle when weighing a letter for postage.

The General Education Co-Teacher asked the students what is an *interval*. Then she replied that it is a *step function*. The General Education Co-Teacher instructed the students to copy down problem *Two* from the board. Then she instructed the students to go on and complete (C) and (D) since they had already completed (A) and (B). The General Education Co-Teacher instructed each group to complete quadratics (C) and (D) and she then wrote the problem on the board and explained it to the students in the class. Then, she stated when you come to the board you must be able to label your coordinates on the graph. Next, she drew two graphs on the board for problems (C) and (D) so that the students could plot their answers for the graphing activity. Then, she stated that you do not have to show your work for this graphing activity today. The General Education Co-Teacher asked again, what are the three types of graphs? Students

responded, linear, exponential, and quadratics function. She then asked for someone to read problem (C). Then she asked the students if they had it labeled correctly on the graph. The Students stated they had labeled it correctly. The General Education Co-Teacher stated that she would prefer that the students use seven hundred or seven thousand when plotting information on the graph.

She inquired if one person goes on the trip how much would he/she pay? The students responded seven hundred dollars. The Exceptional Children's Co-Teacher began to assist a different student within the group on the graphing activity. Next, the General Education Co-Teacher asked if two people went on the trip how much would they have to pay. The Student responded three hundred and seventy-five dollars. Since this was the correct response the teachers asked the students if they could see the curve that developed from plotting the cost of the trip on the graph? Finally, she directed a student to take up the calculators from each group.

Ninth Follow through Co-Teaching Feed Back and Observation

Project Leader findings from the April 26, 2017 Co-Teachers Foundation of the Math 1 Observation.

Exceptional Children's Co-Teacher should have circulated more to ensure students were focused and on task for learning during the graphing quadratic equation functions activity. Class began with the General Education Co-Teacher explaining what the students were going to be learning during the cutting and pasting graphing quadratic equation function activity. Each group had a captain assigned to it for the purpose of leading the graphing quadratic equation activity and to answer any questions that might occur during the cutting and pasting activity.

The Exceptional Children's Co-Teacher circulated answering any questions that the captains did not know during the graphing quadratic equation activity. She communicated to the

General Education Co-Teacher that she had to remain in close proximity to this group of students in order to keep them on task and focused for learning.

The Exceptional Children's Co-Teacher was called to a different group of students that communicated to her that they did not know how to enter the quadratic math problem into the calculator correctly. She demonstrated for the students how to correctly input the quadratic function in to their calculators.

The General Education Co-Teacher explained to a student that he should learn how to work more effectively within a group, if he plans to be successful in life. And she instructed four students to get back on task. The Exceptional Children's Co-Teacher informed the students that if they did not see a shape like the one on the chart, that meant that they would have to draw it. The Exceptional Children's Co-Teacher and General Education Co-Teacher continued to circulate monitoring students assisting in their understanding of the graphing quadratic equation activity.

The General Education Co-Teacher directed the students to get ready to wrap up what they were working on and to staple all of their left over pieces to the top of their paper. Then, she instructed one student to collect the calculators from each group and to leave the scissors, glue sticks, and yard stick in the middle of the desks for the next class.

Ninth Co-Teacher Planning Meeting May 2, 2017

At the co-teaching planning meeting it was discovered that the Exceptional Children's Co-Teacher was requested by the Principal to assume the role as lead teacher in the co-taught classroom due to the General Education Co-Teacher having a last minute family emergency. The Exceptional Children's Co-Teacher delivered a cut and paste review activity on polynomials. She assigned students to work in groups during the practice activity on solving equations. The

students were required to match the equation in pairs once they solved it correctly by inputting the formula into the calculator and arriving at the correct answer. The General Education Co-Teacher communicated to the Project Leader that Benchmark Assessments would be administered on Friday and the students would continue to work on the quadratic equation function once testing was completed. It was made clear at our planning meeting that the Exceptional Children's Co-Teacher would be delivering the Bell Ringer and the General Education Co-Teacher would be delivering the curriculum content for the quadratic equation function activity for the week. The Co-Teachers would be collaboratively providing instruction to students on math academic vocabulary, and support with strategies for solving the quadratic equation function activity. The Co-Teachers would be rotating in and out of groups providing support as needed to enhance the students' knowledge base on quadratic equation functions during the lesson.

Furthermore, the Co-Teachers would chime into the lesson at a teachable moment during the quadratic equation lesson. Finally, the Co-Teachers would be implementing the Parallel Teaching Model during this lesson while also participating in Team Teaching.

Ninth Co-Teaching Lesson Observation

The General Education Co-Teacher instructed the students that were off task to move to a designated group in which she knew they could complete the activity. She instructed the students to write the Bell Ringer down and began solving it. Then the General Educator passed out projects and class assignments to all of the students that were absent on Tuesday. She inquired if they had any questions about the assignments. Next, the General Education Co-Teacher stated that the class schedule had been changed due to Benchmark Assessments. A student called the Exceptional Children's Co-Teacher over to their group to assist them with solving the Bell

Ringer on quadratic equation functions. The General Education Co-Teacher demonstrated for the Exceptional Children's Co-Teacher how she could utilize the graphing calculator to solve the Bell Ringer. The General Education Co-Teacher communicated to the students that she was going need a calculator to solve the quadratic equation functions on her activity sheet. Then the Exceptional Children's Co-Teacher instructed the students to input $y =$ and the formula located on the board into their calculator in order to solve the quadratic equation function. She stated that you would not be able to see the number 208 in your calculator, but you would notice that the numbers would start decreasing and your answer would be between zero and seven. Next, the General Education Co-Teacher explained the Bell Ringer again for the students to ensure clarity to complete the graphing activity sheet. She stated that it was not a difficult problem to solve if you used the calculator. She assured the students once again that it was not a difficult problem if they used their calculators. Then the General Education Co-Teacher interjected that they need to get started on the cutting and pasting quadratic equation function activity. She encouraged the students move quickly to where their group members were located in the class for this activity. The General Education Co-Teacher asked the Exceptional Children's Co-Teacher to tell them how much time they had left in the class period to work on this activity. The General Education Co-Teacher then echoed that you have twelve or fourteen minutes left in this class period. She asked them to complete the activity before they left class.

The General Education Co-Teacher stated that they didn't have any time to waste. The Exceptional Children's Co-Teacher continued to circulate and assist students as needed during the cutting and pasting of the quadratic equation function activity.

In conclusion, the General Education Co-Teacher stated that it is about 2:20 it is time to start wrapping this activity up and besides this is the last day for working on the activity. Please ensure everything is put into its rightful place before the bell rings for dismissal.

Co-Teaching Recommendation from the Observation

The Project Leader provided the following observation recommendation from the above described observation:

- exceptional Children's Co-Teacher needed to have circulated more keeping students on task, as the General Education Co-Teacher was delivering instruction from the board.

Tenth Follow Thorough Observation

Exceptional Children's Co-Teacher presented the Bell Ringer and selected a student to go up to the board and explain the Bell Ringer. Then, the Exceptional Children's Co-Teacher asked did everyone understand what we just covered today in class and does anyone have any questions concerning the Bell Ringer. The Co-Teachers then went directly into the linear and quadratic function activity planned for today. Students were assigned to work in their groups during the math activity. The Co-Teachers had a piece of poster paper attached to the chalk board and the students' had to input the formulas into their calculator's to come up with the answers to the equations. Once, they had solved the equation they had to match the shape with the answer that they had arrived at in their calculators to the poster paper which was attached to the chalk board.

The Exceptional Children's Co-Teacher and General Education Co-Teacher worked with the groups as needed providing assistance with the quadratic equation function activity. However, the General Education Co-Teacher stated that it would have been easier for the

students to solve the distributive property by starting with the second box then moving on to the first box, and then pairing the shapes together, to solve the equation function, after they had input the formula into their calculator's.

The General Education Co-Teacher instructed each group of students to staple their extra pieces of shapes together at the top of their poster paper before turning the assignment in to their Co-Teachers.

Follow through Results from Co-Planning Observation

The Project Leader made the following comments following the co-planning observation:

- Students were focused and on task today in their groups.
- Exceptional Children's Co-Teacher was circulating and keeping student on task and focused for learning during the delivery of instruction by the General Education Co-Teacher.

Administrator's Co-Teaching through Collaborative Planning Observation Results

The Project Leader collected two formal observations from the grade level Administrator at the end of the school year. The purpose of collecting the formal observations were to determine, if there was a correlation between the Project Leader's assessment and Administrator's assessment during both the initial and final phases of the Improving Co-Teaching Through Collaborative Planning Improvement Science Study.

During the initial phase of the study the Project Leader and the Administrator had similar classroom observations:

- The Exceptional Children's Co-Teacher needed to become more assertive in the co-teaching setting.

- Students needed to see the Exceptional Children's Co-Teacher more active and engaged in the co-teaching process.
- Exceptional Children's Co-Teacher needed to be an active participant in the co-teaching process.
- It was believed more effective Collaborative co-planning would assist the Exceptional Children's co-teacher in becoming more proficient in the co-teaching setting.
- It was believed more effective co-planning would enhance the Exceptional Children's Co-Teachers knowledge base on the curriculum content being executed in the co-taught setting.
- The Exceptional Children's co-teacher needs to circulate more to ensure students were focused and on task for learning during co-teaching instruction.
- The Exceptional Children's Co-Teacher needs to take an assertive stance in managing inappropriate student behaviors during the instructional process.

Final observation findings that were observed by the Project Leader and

Administrator were as follows:

- The Exceptional Children's Co-Teacher and General Education Co-Teacher collaboratively planned together every Tuesday from 3:15pm until 4:05 pm.
- The Exceptional Children's Co-Teacher's name was added to the co-teaching lesson plan to signify what she would be teaching during the co-taught lesson.
- The Exceptional Children's teacher circulated to ensure students were focused and on task for learning during presentation by the General Education Teacher.

- The Exceptional Children's Co-Teacher and General Education Co-Teacher taught the math lessons based upon their strengths and according to the data obtained from Schoolnet.
- The Exceptional Children's Co-Teacher provided the students with the strategies during the lesson and the General Education Co-Teacher provided the students with the curriculum content during the lesson.
- The Exceptional Children's Co-Teacher was viewed as an equal by the students in the co-taught class due to forty-five minutes of co-teacher planning.
- The Exceptional Children's Co-Teacher feels more confident about herself in the co-taught class now, because she is no longer learning the content along with the students, due to collaborative co-planning.
- The Exceptional Children's Co-Teacher has earned a voice and respect in the co-teaching setting because of forty-five minutes of Co-Teacher planning.

Benchmark Results and Measures of Improvement

The Improving Co-Teaching through Collaborative Planning Study has made it evident that when you successfully execute the recommended components of co-planning and co-teaching such as:

- Forty-five minutes of collaborative planning once a week.
- Buy-in from the administrators at the school.
- Constant monitoring and supportive feedback from a Coach and Administrators.

- Co-Teachers instructing the lesson based upon their strengths and students needs according to the data obtained from Schoolnet.
- The General Educator providing curriculum content during the lesson and the Exceptional Children's Co-Teacher providing the strategies during the lesson.

It was made evident that the Co-Planning and Co-Teaching Process did have a positive impact on the Schoolnet Benchmark Assessment Results in the Foundations of Math 1 Course. As a result this problem of practice, small scale proof of concept model will be implemented in appropriate classrooms throughout the Hertford County School system.

Administrators support has proven to be instrumental in the implementation of the co-teaching and co-planning process. Researchers Nierengarten and Hughes (2010) acknowledged that the role that administrative support plays in the success of co-teaching cannot be overstated. Nearly every factor for successful co-teaching implementation is dependent on an administration that is supportive and invested in the initiative.

Moreover, it has been recommended by the Project Leader that the administrators continue to support the co-teaching and co-planning process by providing:

- staff development for the teacher to ensure the co-teaching through collaborative process will continue to be delivered with fidelity.
- the continuation of allotting 45 minutes per week is crucial to ensure time for co-teaching through collaborative planning for a successful co-taught lesson.
- time in his/her busy schedule to attend staff development for the principal is vital to ensure they know and grow professionally in what to look for during classroom walk-throughs, delivery of co-teaching through collaborative planning process, and when implementing yearly observations.

- the principal continue to buy-into the process and allot time for co-teaching through collaborative planning process.

This process was identified by the administrator in the study as a means for obtaining and producing growth on the Foundation of Mathematics 1 Benchmark assessment scores in the Northeastern, North Carolina school district.

As a result, the students that were assigned to the Foundations of Math 1 Course during second semester 2016-2017 did have a five point increase in their Schoolnet Benchmark Assessment scores. Students that were assigned to the course during first semester 2016-2017 without the co-planning and co-teaching element had no increase.

In fact, it was projected that 10% of the twenty students would pass the Bench Mark Assessment after implementing the co-planning and co-teaching process at the end of second semester 2016-2017. None of the twenty students were projected to pass the Bench Mark Assessment before the co-planning and co-teaching process was executed in the Foundations of Math 1 Course.

The Project Leader's Improving Co-Teaching through Collaborative Planning Improvement Science Study indicated the following elements were crucial to the co-teaching and planning process:

- Collaborative co-planning for forty-five minutes per week and co-teaching based upon the Co-Teachers strengths according to the data obtained from the Schoolnet Assessment.
- Constant monitoring, supportive feedback, and follow-up observations and recommendations made by the Project Leader and Administrators and with the Administrators buy-in.

It was found that Co-Planning and Co-Teaching did have a positive outcome on the Schoolnet Benchmark Assessment Results of the students assigned to the Foundations of Math 1 Course during second semester 2016-2017 at a local High School in Northeastern North Carolina. A key improvement finding was that enhancing the skills of the Special Education Teacher in co-teaching process essentially doubled the teaching resources in the classroom by allowing one of the educators to present the content while the other circulated in the classroom assisting students.

Epilogue: Reflections, Implications and Recommendations and Conclusions

Professional Development

One of the most significant findings from the study was the importance of professional development in the Co-Teaching and Collaborative Planning Process. During this study professional development was provided by the Project Leader in the areas listed below. This professional development was crucial to the success of the project. The following are a listing of issues that must be provided in professional development training:

- Adequate time must be provided for Planning.
- Necessity of Special Education Teacher being involved in all phases of the instructional planning process.
- Necessity of the Special Education Teacher being involved in all phases of instruction during all phases of teaching in the class itself.
- Instructional planning must be based on the strengths of both teachers.
- The importance of School Net data is key to the implementation of the project.

Implications

The following are implications that should be observed for success for the overall project:

- Implementing the Co-Teaching model with fidelity in effect doubles the teaching capacity in the classroom.
- Fully employing the instructional skills of each teacher as either a curricular specialist or instructional strategist in every teaching occasion more readily realized the potential of the Co-Teaching model.
- Actively engaging the special education teacher as a full partner in the instructional process enhances not only the education of the special education students but also enhances the education of regular education students.

Recommendations

The following are recommendations that are provided to the Hertford County School System to ensure the success of future co-teaching and collaborative planning ventures:

- This small scale proof of concept project should now be expanded and implemented throughout Hertford County.
- All principals should receive intensive professional development training in the Co-Teaching Model as implemented in this study.
- All teachers should receive intensive professional development training in the Co-Teaching Model as implemented in this study.
- Sufficient time must be allotted for instructional planning.
- Only teachers agreeing to Co-Teach and enjoying a good relationship with their Co-Teacher should be assigned to a Co-Teaching relationship.

Conclusions

The following are conclusions gained from insights developed during the project:

- When implemented with fidelity the Co-Teaching Collaborative Planning model can be effective in classrooms in Hertford County.
- To insure successful implementation of the model, the regular classroom teacher must relinquish control and accede to a genuine collaborative relationship.
- The Special Educations teacher's content and curricular knowledge are enhanced through the Co-Teaching and Collaborative Planning process.
- Student Perceptions of the Special Education Teacher are positively changed when the Special Education Teachers becomes a fully functioning partner in a Blended Classroom.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL



EAST CAROLINA UNIVERSITY
City & Medical Center Institutional Review Board Office
Brody Medical Sciences Building · Mail Stop 682
Bojiac Boulevard · Greenville, NC 27834
252-744-2914 · Fax 252-744-2284 · www.ecu.edu/irb

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB
To: Patty Hardy
CC: Jim McDowelle
Date: 4/3/2017
Re: UMCIRB 17-000415 IMPROVING CO-TEACHING THROUGH
COLLABORATIVE PLANNING PROCESS

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 4/3/2017 to 4/2/2018. The research study is eligible for review under expedited category #7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Pre-Questions for Co-Teaching Study	Interview/Focus Group Scripts/Questions
CONFLICT OF INTEREST FORM	COI Disclosure Form
Consent to implement Improvement Science Study	Recruitment Documents/Scripts
IMPROVING CO-TEACHING THROUGH COLLABORATIVE PLANNING PROCESS IN AN EASTERN NORTH CAROLINA DISTRICT	Study Protocol or Grant Application
Participant	Recruitment Documents/Scripts
Participant	Recruitment Documents/Scripts
Participant	Recruitment Documents/Scripts
Participant	Recruitment Documents/Scripts
Questions for Co-Teaching Study	Interview/Focus Group Scripts Questions
Superintendent Consent Form for school participation	Consent Forms
Survey	Surveys and Questionnaires
The Chairperson (or designee) does not have a potential for conflict of interest on this study.	

APPENDIX B: CO-TEACHERS FINAL SURVEY RESULTS

Co –Teachers concluding Responses from the Co-Teaching through Collaborative Planning Process Survey

The survey was administered at the conclusion of the study to General Education and Special Education Co-Teachers assigned to the Foundation of Mathematics 1 Course at Hertford County High School for the purpose of obtaining their concluding perspective on Co-Teaching and Co-Planning. The following results of the survey were provided to highlight and document the status of collaboration and planning in the Foundation of Mathematics 1 Course at the conclusion of the co- teaching and co-planning study.

Data results revealed at the conclusion of the survey that the Exceptional Children’s Co-Teacher would benefit from maximizing her skills in instructional delivery during the co-planning and co-teaching process. Moreover, it is important to note that this situation was not attributed to the lack of training or co- planning between the two education professionals but essentially the way that all parties concluded things should be.

Final Results

Questions	Rarely	Sometimes	Usually	Always
I often present lessons in the co-taught class.				General Educator And Special Educator
Planning for classes is the shared responsibility of both teachers.				General Educator And Special Educator
I feel confident in my knowledge of curriculum content.			Special Educator	General Educator
Time is allotted (or found) for common planning.			General Educator And Special Educator	
Planning can be spontaneous with changes occurring during the instructional lesson.		Special Educator	General Educator	
The administration encourages and supports both teachers and co-teaching.				General Educator and Special Educator
Students accept both teachers as equal partners in the learning process.			General Educator	Special Educator
I feel happy about my relationship with my co-teacher.				General Educator and Special Educator
We hold meetings and give honest feedback about lessons.				General Educator And Special Educator

APPENDIX C: GRADE LEVEL ADMINISTRATOR'S SECOND CO-TEACHING OBSERVATION

The Grade Level Administrator performed a second Co-Teaching observation on lesson five. During the observation a math lab activity was observed by the administrator. Next, the observer witnessed the team teaching model being executed by the Co-Teachers. The General Educator communicated the purpose for the resources being on the students desks during the activity. Then, the General Educator articulated the role that each teacher would be performing during the lesson. Moreover, the observer documented that problems developed with students' attention and time on task during the latter portion of the class. It was determined that part of the problem was that the students did not fully comprehend some of the concepts that they had been taught and did not completely understand how to proceed with the teaching strategies that they had just received. Last but not least, it was documented by the observer that after conferring the collaborators decided to reiterate both the concepts and the strategies from the math lab activity.

Project Leader and Grade Level Administrator's collaborative meeting results from co-taught lesson gleaned;

- Students would benefit from the reiteration of both the concepts and strategies of today's lesson
- The Exceptional Children's Co-Teacher needs to provide more assistance with keeping students on task when the General Education Co-Teacher is at the board delivering instruction
- Observers agreed that problems developed with student attention and time on task during the latter portion of the class due to the lack of clarity on today's assignment

**APPENDIX D: GRADE LEVEL ADMINISTRATOR'S THIRD
CO-TEACHING OBSERVATION**

The Grade Level Administrator performed a third co-teaching observation on lesson seven. During the observation the Grade Level Administrator observed a team-teaching lesson on equation polynomial. The Exceptional Children's Teacher was observed delivering the Bell Ringer, Vocabulary, and Strategies for the Co-Taught lesson. The General Educator was observed presenting the content and expectations for the lesson since it was a new skill. The observer noted that both teachers instructed based upon their strengths according to the data obtained from the Schoolnet Assessment tool. Moreover, it was observed by the Grade Level Administrator that the lesson was not impeded when the General Educator was called out of the class to communicate with a fellow staff member. The Exceptional Children's Co-Teacher went to the board and continued on with solving the four square polynomial word problem.

Strengths Identified by the Project Leader and Grade Level Administrator during the Seventh Co-Teaching Observation

- students were directed to focus their attention on the board and co-teacher during the delivery of the polynomial activity
- when the General Education Co-Teacher was called into the hallway by a staff member the Exceptional Children's Co-Teacher stepped up to the board and continued on with explaining and solving the polynomial math problem
- the Exceptional Children's Co-Teacher graded some math papers during her lunch period to get an idea of where the students' deficits and strengths were in solving polynomials

APPENDIX E: GRADE LEVEL ADMINISTRATOR'S FOURTH CO-TEACHING OBSERVATION

The Grade Level Administrator performed a fourth co-teaching observation on lesson ten. During the observation the Grade Level Administrator observed the General Education Co-Teacher strategically placing students into groups for the purpose of ensuring high time on task for learning. Next, the General Educator was observed passing out assignments to students that were absent from the math class during the previous day. Then, the Exceptional Children's Co-Teacher was observed assisting a group of students with solving the Bell Ringer on quadratic equation functions. Moreover, during the observation the Grade Level Administrator observed the General Education Teacher demonstrating for the Exceptional Children's Co-Teacher how she could utilize the graphing calculator to solve the Bell Ringer. As a result, the Grade Level Administrator observed the Exceptional Children's Co-Teacher instructing the students on how to input a formula into the calculator for the purpose of solving a quadratic equation function math problem. Last but not least, the Grade Level Administrator observed the General Education Co-Teacher explaining the Bell Ringer again for the students to ensure clarity and mastery while solving the graphing activity sheet.

Project Leader and Grade Level Administrator's Co-Teaching Recommendation for Improvement of the Tenth Observation

- exceptional Children's Co-Teacher needed to have circulated more keeping students on task, as the General Education Co-Teacher was delivering instruction from the board
- calculators should have already been on the students desks before they entered the classroom to ensure high time on task for learning

