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Impact of cooperative co-teaching relationships on student achievement outcomes in the 7th grade inclusion mathematics class

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ABSTRACT

Since the inception of the No Child Left Behind law in 2002, much attention has been paid to its effects on the special education population of students. This law, as well as the Individuals with Disabilities Education Improvement Act of 2004 (IDEA), required school districts in the United States to include students with special needs in general education classrooms to provide an atmosphere of least restricted environment (LRE). This practice has come to be known as inclusion which has become the forefront of educating students with special needs in United States' public schools. Inclusion continues to be a controversial practice and matter of debate within educational circles with varying attitudes among teacher towards this practice. Research has found that in order for the model of inclusion to be carried out successfully, a key ingredient is cooperative communication and collaboration between the special education and general education teachers. If teacher collaboration is emphasized as the key to success in the inclusion model, it is important to assess the effects of a cooperative co-teaching relationship among inclusion classroom teachers. Specifically, this study asks, does a cooperative relationship between regular education and special education teacher in the 7th grade inclusion mathematics classroom have a positive effect on student achievement as measured by the North Carolina End-of Grade (EOG) Mathematics test? The participants in this study are 276 teachers practicing the inclusion co-teaching model, 138 regular education mathematics teachers and 138 special education teachers. The study assesses all Winston-Salem Forsyth County Schools seventh grade inclusion mathematics classrooms. The pools of student participants that are being assessed are 3,447 seventh grade students in the inclusion mathematics classrooms. Teachers were first given Teacher Collaboration Assessment Survey (TCAS) to assess whether or not their relationship with their co-teacher was deemed cooperative or uncooperative. Then data was collected after the students in the inclusion classes took their End-of-Grade Mathematics standardized test. Results from the survey showed that that inclusion teaching pair have a collaborative relationship in the 7th grade mathematics class. This collaborative relationship is positively correlated with student achievement outcomes on the NC EOG math test. These findings have important implications for schools and educators who work in inclusive classrooms and suggest that fostering collaboration among inclusion teaching pairs can have a positive impact on

student outcomes. With the intense implementation of the inclusion model since No Child Left Behind, further research aimed on collaboration and student achievement should focus on the co-teaching relationship as many of American children are learning in the inclusion classroom, whether or not they are classified as regular education, or special education.

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Chapter One: Introduction

This research aims to ask, does a cooperative co-teaching relationship among special education teacher and regular education teacher in the inclusion classroom effect student performance? Special Education in the United States is changing; new guidelines and mandates are implemented constantly. Most districts place their special education students in the Least Restrictive Environment (LRE) which means that the student is with their non-disabled peers as much as their disability will allow. With the practice and implementation of LRE, the inclusion model was born. Inclusion allows special education students and regular education students to learn in the same classroom. However, instead of one teacher, there are two: the special education teacher and the regular education teacher. Most inclusion models are based on a co-teaching paradigm and the special education and regular education teacher must plan their lessons and collaborate to meet all the diverse needs in the inclusion classroom. Practitioners report seeing this model work with its inclusive and harmonious intention, but also many have seen the inclusion model fail students who arguably, need the most support. When the inclusion

model works well and is implemented with best practice research-based strategies, the co-teachers (regular teacher and special education teacher) are very cooperative and maintain respectful professional relationships. This professional relationship hinges on this practice of collaboration.

According to DuFour (2011), collaboration is a systematic process where teachers work together interdependently to analyze and improve their professional practice, leading to better outcomes for students, their team, and their school. A teacher collaboration model may involve valuing individual contributions equally, having a shared goal, sharing responsibility and accountability, utilizing shared resources, and emphasizing shared decision-making, trust, and respect (Sevier County Special Education, 2009).

Schmoker (2007b) suggested that collaboration allows teachers to deepen their understanding of teaching. It involves discussions on assessing fundamental principles and the benefits of best practices, evaluating and refining professional goals, engaging in constructive criticism, fostering supportive professional relationships, and implementing insightful practices (British Columbia Teachers' Federation, n.d.). Garcia (2008) noted that teacher collaboration can take place in various settings, such as teacher learning

communities, professional learning communities, study groups, grade level or departmental teams, leadership academies, workshops, institutes, and retreats.

Chadbourne (2004) categorized teacher collaboration into six types: political/industrial collaboration, social collaboration, technical collaboration, academic collaboration, collaborative planning, and joint classroom-based work. Political/industrial collaboration involves teacher union activities aimed at improving working conditions (Chadbourne, 2004). Loyalty is the norm in this type of collaboration, where assistance is provided to colleagues who require political influence and professional support (Chadbourne, 2004). It proves beneficial when teachers need to undergo training for implementing new practices, especially when they feel undervalued and treated as workers rather than professionals (Allington, 2002). Teachers require encouragement when the pressures of teaching become overwhelming, hindering their ability to fulfill necessary tasks (Chadbourne, 2004). Collaborative meetings are arranged to discuss concerns from students, parents, colleagues, and school administrators, find solutions, and improve working conditions (Chadbourne, 2004).

Social collaboration addresses the need for socialization, camaraderie, and building relationships among teachers (Chadbourne, 2004). It focuses on fostering interpersonal relationships, respect, and care, which contribute to

creating a positive community and a collegial climate among teachers (Chadbourne, 2004). Fullan (2007) emphasized the importance of establishing formal situations for teachers to work together, such as team teaching and integrated lesson design. These structures provide a foundation for sustained communication and shared goals, leading to a sense of community and increased effectiveness. Social collaboration eliminates rejection, isolation, and cliques and can be strengthened through informal interactions, celebrations, extracurricular activities, sharing personal lives, supporting colleagues during challenging times, and engaging in team-building exercises (Chadbourne, 2004).

Technical collaboration involves giving advice and sharing immediate, specific, and procedural strategies and ideas (Chadbourne, 2004). It helps teachers acquire techniques and strategies for managing practical aspects of their profession. Teachers share lesson plans, books, worksheets, and ideas related to applying modern teaching methods (Chadbourne, 2004). Hirsh (2009) described technical collaboration as the identification of learning teams that follow a cycle of continuous improvement. This cycle begins with examining student data, identifying areas of improvement, creating learning experiences, and reflecting on the impact on student learning (Hirsh, 2009).

Academic collaboration is a complex group effort that goes beyond collaborative planning and technical collaboration. It involves teachers sharing diverse theories, principles, and concepts and applying them to real classroom situations (Burnstein, Kretchmer, & Lombardi, 2003). Teachers collaborate to assess student work, review curriculum, and develop various assessments, aiming to offer a consistent and unified curriculum (Chadbourne, 2004).

Collaborative planning encompasses inquiry, reflection, constructive criticism, and discussion. Teachers focus on long-term coursework, classroom practices, and underlying assumptions to drive educational practice (Chadbourne, 2004). Discussions revolve around journal articles, action research findings, and teaching methods relevant to individual students (Chadbourne, 2004). Sagor (2004) highlighted the importance of collaborative action research and analyzing data as a team, which leads to a clearer understanding of teaching phenomena and student learning. Little (2003) emphasized the value of looking at student work to involve students in teacher deliberations and foster a professional community focused on improving teaching and learning.

Joint classroom-based work includes team teaching, peer coaching, and collaborative action learning (Chadbourne, 2004). This type of collaboration is challenging yet powerful. It requires teachers to share their teaching philosophies

and practices, promoting self-concepts, trust, sincerity, and tolerant attitudes (Chadbourne, 2004). Joint classroom-based collaboration incorporates action research and learning projects, providing opportunities for teachers to learn about their own teaching, give feedback on each other's practices, and offer insights on student progress (Chadbourne, 2004).

The essence of collaboration lies in teachers working together to enhance their teaching skills and improve student achievement (Sevier County Special Education, 2009). According to DuFour (2003), collaboration is a systematic process where teachers work interdependently to analyze and improve professional practice for the benefit of students, the team, and the school. Goddard and O'Brien (2004) found positive effects of teacher collaboration on student achievement in Mathematics and Reading. This research aims to ask, does a cooperative co-teaching relationship among special education teacher and regular education teacher in the inclusion classroom effect student performance? As discussed, there has been countless research that discusses the benefits of collaboration and student achievement, stating that when professionals and parents work together students benefit greatly academically. In this study, student performance will be measured by the NC 7th grade End-of-Grade (EOG) mathematics test. Co-Teachers will be assessed based on the Teacher

Collaboration Assessment Survey (TCAS) (Woodland, Lee, & Randall, 2013). This survey is a widely used instrument for measuring teacher collaboration in schools. The survey consists of 30 items and measures four dimensions of teacher collaboration: Dialogue, Decision Making. Action, and Evaluation. The survey will be administered to the inclusion teachers prior to the administration of the EOG test. The goal of this study is to learn more about the effectiveness of inclusion teaching relationships and student achievement outcomes.

Teacher Collaboration

Teacher collaboration is a popular approach to improving teaching and learning in schools. It involves teachers working together to develop new teaching strategies, share ideas, and support each other in their professional development. The conceptual framework behind teacher collaboration is based on several key principles, including social constructivism, distributed leadership, and a focus on student learning.

Social Constructivism

Social constructivism is a learning theory that emphasizes the importance of social interaction in the learning process (Bolhuis & Voeten, 2004). According to this theory, knowledge is constructed through social interaction, and learning is a collaborative process that involves the sharing of ideas and experiences.

Social constructivism provides the theoretical basis for teacher collaboration, as it emphasizes the importance of collaboration in the learning process.

Collaborative learning is based on the idea that students learn better when they work together in groups. Similarly, teacher collaboration is based on the idea that teachers learn better when they work together in teams. When teachers collaborate, they are able to share their ideas and experiences, learn from each other, and develop new teaching strategies that can enhance student learning (Vescio, Ross, & Adams, 2008).

Distributed Leadership

Distributed leadership is another key principle of the conceptual framework behind teacher collaborative approaches. Distributed leadership is based on the idea that leadership is a shared responsibility that is distributed across the organization, rather than being the sole responsibility of the principal or other school leaders (Hargreaves & Fink, 2004). Distributed leadership provides the basis for teacher collaboration, as it emphasizes the importance of teachers taking an active role in school leadership and decision-making.

When teachers collaborate, they are able to take on leadership roles within their teams, which can help to distribute leadership responsibilities across the organization. This can lead to more effective decision-making, as teachers are

able to share their expertise and perspectives on a wide range of issues related to teaching and learning (Hord, 1997).

Focus on Student Learning

A key focus of the conceptual framework behind teacher collaborative approaches is on student learning. Teacher collaboration is seen as a way to improve student learning outcomes by developing new teaching strategies, sharing best practices, and identifying and addressing student learning gaps. The focus on student learning provides the motivation for teacher collaboration, as it emphasizes the importance of improving teaching and learning in schools (Vescio et al., 2008).

When teachers collaborate, they can develop new teaching strategies that are tailored to the needs of their students. They can also identify and address student learning gaps, such as areas where students are struggling to understand key concepts. This can lead to improved student learning outcomes, as teachers are able to provide more effective instruction that meets the needs of their students (Little, 1990).

Inclusion Framework

Inclusion teaching is a teaching model that aims to provide students with disabilities access to general education curriculum to the greatest extent possible

(Individuals with Disabilities Education Act, 2004). It is a collaborative approach between a regular education teacher and a special education teacher, which emphasizes equal opportunities for all students to learn and succeed. It recognizes that each student is unique, with their own set of strengths and challenges (Friend & Cook, 2016).

Inclusion teaching is grounded in the principle of equity and fairness. According to the National Council for Accreditation of Teacher Education (2008), equity means "providing all students with the resources they need to be successful" (p. 3). It is an ethical and legal responsibility of schools to provide equal opportunities to students with disabilities. The inclusion teaching model is one way to meet this requirement (IDEA, 2004).

To implement inclusion teaching successfully, educators employ various strategies and techniques, including collaboration between regular education and special education teachers, differentiated instruction, and assistive technology. This approach not only benefits students with disabilities but also has positive outcomes for non-disabled students (Mastropieri & Scruggs, 2010).

Inclusion teaching is a teaching model that emphasizes the equal opportunities for all students to learn and succeed. One of the essential components of inclusion teaching is the Least Restrictive Environment (LRE)

concept. According to the Individuals with Disabilities Education Act (IDEA, 2004), the LRE principle is that "to the maximum extent appropriate, children with disabilities are educated with children who are not disabled, and special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability of a child is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily" (Kauffman, 2001).

The LRE principle means that students with disabilities are to be educated with their non-disabled peers to the maximum extent possible. The goal is to provide all students with access to the general education curriculum, regardless of their disabilities. The LRE principle is intended to promote socialization and to provide students with disabilities the opportunity to interact with their non-disabled peers, which can help to develop positive attitudes towards diversity (Sapon-Shevin, 2013).

The inclusion teaching model provides a framework for implementing the LRE principle effectively. Inclusion teaching involves collaboration between regular education and special education teachers, who work together to provide individualized support and instruction to all students.

The inclusion teaching model has many benefits for students with disabilities. Research shows that students who receive instruction in inclusive classrooms achieve better academic and social outcomes than students who receive instruction in segregated environments (Algozzine et al., 2001). Inclusive classrooms offer students with disabilities the opportunity to interact with their non-disabled peers, which can help to develop positive attitudes towards diversity (Sapon-Shevin, 2013).

Inclusion teaching is not without challenges and limitations. For example, teachers require additional support and resources to accommodate diverse learning needs effectively. Effective communication and collaboration between teachers is also essential for successful inclusion teaching (Friend & Cook, 2016). Some critics argue that inclusion teaching can have a negative effect on non-disabled students by reducing the amount of individual attention they receive (Kauffman, 2001).

Inclusion classes are becoming more popular in schools, as they provide a supportive environment for students with disabilities or special needs to learn alongside their peers without disabilities. Inclusion classes are designed to provide these students with equal opportunities for academic achievement, socialization, and personal growth. Co-teaching, the practice of two teachers

working together to meet the needs of all students in the classroom, is commonly used in inclusion classes to promote collaboration and enhance the learning experience for all students. However, poor co-teaching collaboration can lead to negative outcomes for students, including reduced academic achievement.

Statement of the Problem

Inclusion classes have become increasingly popular in schools as they provide a supportive environment for students with disabilities or special needs to learn alongside their peers without disabilities. With the overall aim for schools in achieving academic achievement, one must examine the problems with the poor collaboration within inclusion classrooms. Co-teaching is commonly used in inclusion classes to promote collaboration and enhance the learning experience for all students. However, despite the benefits of co-teaching, many inclusion classrooms suffer from poor collaboration between teachers, resulting in negative effects on student learning. Teachers in these classrooms may struggle to communicate effectively, coordinate lesson plans, and provide appropriate accommodations for students with disabilities. Additionally, there may be a lack of clarity around roles and responsibilities, leading to confusion and frustration for both teachers and students. Poor co-teaching collaboration can result in missed opportunities for students to receive differentiated

instruction, which can lead to lower academic achievement (Murawski & Dieker, 2008).

The causes of poor co-teaching collaboration in inclusion classes are complex and multifaceted. Research has identified several factors that can hinder collaboration between co-teachers, including differences in teaching styles, lack of communication, and conflicting priorities.

One of the main causes of poor co-teaching collaboration is differences in teaching styles. Co-teachers may have different approaches to teaching and may find it challenging to integrate their teaching styles effectively. This can lead to a lack of coherence in the instructional approach, which can confuse students and make it difficult for them to learn (Murawski & Dieker, 2008).

Another factor that can hinder co-teaching collaboration is a lack of communication. Co-teachers may struggle to communicate effectively with each other, leading to misunderstandings and confusion about their roles and responsibilities. This can result in missed opportunities for students to receive differentiated instruction, which can impact their academic achievement (Dieker & Murawski, 2003).

Finally, conflicting priorities can also hinder co-teaching collaboration. Co-teachers may have different goals and objectives, making it challenging to work

together effectively to meet the needs of all students in the classroom. This can lead to frustration and tension between co-teachers, which can negatively impact the learning environment (Murawski & Swanson, 2001).

Poor co-teaching collaboration can have negative effects on student achievement. When co-teachers are not working together effectively, students may miss out on opportunities to receive differentiated instruction that is tailored to their individual needs. This can lead to lower academic achievement and decreased motivation to learn (Dieker & Murawski, 2003).

Additionally, poor co-teaching collaboration can impact the social and emotional development of students. When co-teachers are not working together effectively, students may feel confused and frustrated, leading to a lack of engagement in the classroom. This can result in lower self-esteem, increased behavior problems, and decreased social skills (Murawski & Swanson, 2001).

Providing opportunities for professional development can also be an effective way to improve co-teaching collaboration. Co-teachers should be given opportunities to attend professional development sessions together, where they can learn new strategies and techniques for working together effectively. This can also help to promote ongoing communication between co-teachers (Friend & Cook, 2010).

Promoting ongoing communication between co-teachers is essential for improving co-teaching collaboration. Co-teachers should meet regularly to discuss instructional strategies, student progress, and any challenges they may be facing. This can help to ensure that co-teachers are working together effectively and can prevent misunderstandings or conflicts from arising (Dieker & Murawski, 2003).

Purpose of the Study

The purpose of this study is to investigate whether a cooperative co-teaching relationship in the inclusion class has an impact on student achievement as measured by the End of Grade (EOG) test (WSFCS 2021). The inclusion model of education aims to provide students with disabilities equal access to education and socialization opportunities. However, the success of inclusion depends on ensuring that all students in the classroom receive the support they need to succeed academically and socially. Cooperative co-teaching is an approach that involves a general education teacher and a special education teacher working together to provide instruction to all students in the classroom. This model has been shown to be effective in improving student outcomes in traditional classrooms, but its effectiveness in the context of inclusion classrooms has not been fully investigated.

Previous research has shown mixed results regarding the effectiveness of inclusion classrooms in improving student outcomes. Some studies have found that inclusive classrooms can lead to improved academic and social outcomes for students with disabilities (Swanson, Hoskyn, & Lee, 1999; Scott, Vitello, & Murrell, 2006), while others have found mixed results (Janney & Snell, 2000; Martin, Huber Marshall, & Sale, 2013). These mixed results suggest that further investigation is necessary to understand the impact of inclusion on student achievement.

Cooperative co-teaching has also been studied extensively. One study found that students in classrooms where cooperative co-teaching was implemented showed significant gains in reading and math achievement compared to students in traditional classrooms (Murawski & Dieker, 2004). Other studies have found that cooperative co-teaching can lead to improved student behavior, increased engagement, and greater teacher satisfaction (Villa, Thousand, & Nevin, 2008). However, there is limited research specifically investigating the impact of cooperative co-teaching in the context of inclusion classrooms.

One study by Mastropieri et al. (2005) found that students with disabilities in inclusion classrooms where cooperative co-teaching was implemented had

higher academic achievement than those in classrooms without cooperative co-teaching. However, this study did not examine the impact on non-disabled students or compare results to EOG scores. This study aims to fill this gap by investigating the impact of cooperative co-teaching on both disabled and non-disabled students in inclusion classrooms and measuring its impact on EOG scores.

Research Question

This study asks whether a cooperative relationship between regular education and special education teacher in the 7th grade school inclusion mathematics classroom has a positive effect on student achievement as measured by the North Carolina End-of-Grade (EOG) Mathematics test.

Goals, Objectives, and Hypothesis

The goals and objectives of this study are aligned with the broader goals of inclusive education, which aim to provide equal access to education and socialization opportunities for all students, including those with disabilities. The study aims to contribute to the body of research on effective teaching approaches in inclusive classrooms and provide valuable information to educators, administrators, and policymakers about how to improve outcomes for students with disabilities. The results of this study have important implications for the

education of students with disabilities and for the implementation of inclusion models in schools. If cooperative co-teaching is found to be effective in improving student achievement in inclusion classrooms, it could provide a valuable approach for educators to ensure that all students in the classroom receive the support they need to succeed academically and socially. This study also has broader implications for the field of education by contributing to our understanding of effective teaching approaches in inclusive classrooms.

Based on previous research on the effectiveness of cooperative co-teaching in traditional classrooms (Murawski & Dieker, 2004) and the importance of support and inclusion for student achievement (Villa et al., 2008), it is hypothesized that a cooperative co-teaching relationship in the inclusion class will positively impact student achievement. Specifically, it is hypothesized that students in inclusion classrooms where cooperative co-teaching is implemented will have higher scores on the EOG tests than students in inclusion classrooms without cooperative co-teaching.

Biographical Research Motivation

The decision to conduct research on teacher collaboration in inclusion classes arises from a deeply personal and transformative journey as a special education teacher between 2009 and 2013. During this period, I had the privilege

of teaching in inclusion classes alongside regular education teachers. The experiences and challenges encountered during those years have ignited a passion within me to explore the complexities of teacher collaboration in inclusive settings.

As a special education teacher in inclusion classes, my primary responsibility was to support students with disabilities by ensuring their access to the curriculum and implementing their Individualized Education Programs (IEPs). However, I encountered significant difficulties in collaborating effectively with regular education teachers. Our differing instructional styles, perspectives, and lack of shared planning time often hindered the seamless integration of our expertise and instructional approaches. Consequently, students with disabilities did not receive the necessary support and accommodations to fully participate in the general education curriculum, as mandated by their IEPs.

The absence of a collaborative environment also impacted the development of respect and rapport between special education and regular education teachers. It created a culture of isolation, where each teacher operated independently, further exacerbating the challenges faced by students with disabilities. The lack of cohesion and shared accountability hindered the creation

of a supportive teaching community, leading to feelings of frustration, burnout, and a limited exchange of best practices.

Despite the obstacles, I also had the opportunity to witness instances where effective collaboration between special education and regular education teachers yielded remarkable results. In these cases, a strong teaching relationship was established, characterized by open communication, mutual respect, and shared decision-making. The positive outcomes were evident as students with disabilities flourished academically, socially, and emotionally within the inclusive classroom environment. These experiences highlighted the transformative potential of collaborative practices and the vital importance of fostering effective partnerships between educators.

Reflecting on my experiences, it became evident that the success of collaboration in inclusion classes is contingent upon comprehensive school and administrative support. The absence of such support significantly hinders the ability of teachers to collaborate effectively and meet the diverse needs of students with disabilities. School leaders play a crucial role in creating an inclusive culture by establishing policies, allocating resources, and fostering a supportive environment that values and encourages collaboration.

I observed that the critical role of school leaders who must prioritize and promote the concept of inclusion as a core value within the educational community. It became apparent that they must ensure that inclusive practices are embedded in the school's mission, vision, and policies, fostering a shared understanding among all stakeholders. By setting a clear vision for inclusive education, school leaders create a foundation upon which collaborative practices can thrive.

In addition, the allocation of adequate resources would have been essential to support collaborative efforts in inclusion classes. This includes providing dedicated planning time for special education and regular education teachers to collaborate, share instructional strategies, and develop cohesive lesson plans. Access to professional development opportunities specifically focused on inclusive practices is also crucial. These initiatives empower teachers with the knowledge and skills necessary to create effective inclusive classrooms.

Furthermore, school leaders must foster a supportive environment that recognizes and values the contributions of all educators involved in the inclusion process. This involves promoting open lines of communication, encouraging regular feedback and reflection, and celebrating collaborative achievements. By creating a culture of collaboration and shared responsibility, school leaders can

mitigate the isolation and burnout that often accompany the challenges of inclusion.

While my personal experiences as a special education teacher provided the initial impetus for this research, it is important to emphasize that this study aims to transcend individual anecdotes and contribute to the broader field of inclusive education. The research I am undertaking seeks to systematically investigate the factors that contribute to successful teacher collaboration in inclusion classes and examine its impact on student outcomes. By conducting a rigorous study, I aim to generate empirical evidence that can inform educational policies, teacher training programs, and professional development initiatives.

The findings from this research have the potential to shape the practices and attitudes surrounding inclusion in schools. They can guide administrators in creating supportive structures and systems that facilitate effective collaboration. Moreover, they can equip teachers with the knowledge and strategies needed to work together seamlessly, leveraging their diverse expertise to meet the needs of all students.

The research outcomes can raise awareness among policymakers and educational stakeholders about the critical importance of school and administrative support in the success of inclusive education. It is my hope that

this research will serve as a catalyst for change, prompting the allocation of resources and the implementation of policies that prioritize collaboration and support for educators in inclusion settings. By doing so, I aspire to contribute to the advancement of inclusive education, where every student can thrive and reach their full potential.

Definition of Terms

IDEA: The Individuals with Disabilities Education Act of 2004. "The Individuals with Disabilities Education Act (IDEA) is a federal law that requires each state to ensure that a free appropriate public education (FAPE) is available to all eligible children with disabilities residing in that state" (United States Department of Education, 2004, para. 1).

Inclusion: "100% placement in age-appropriate general education classes or a range of learning opportunities both within and outside of the general education classroom" (Berry, 2006, p. 3).

Specific Learning disability: (LD). "A disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, in which the disorder may manifest itself in significantly below average academic achievement corresponding to a percentile rank of about 16 on at least two measures of ability to listen, think, speak, read, write, spell, or do

mathematical calculations. Evidence of co-occurring functional impairment in adaptive functioning must also be present" (Brueggemann, Kamphaus, & Dombrowski, 2008, p. 6).

Least restrictive environment: LRE. " Each state must ensure, to the maximum extent appropriate, that intervention services are provided in natural environments, including the home and community settings in which children without disabilities live" (Etscheidt, 2006, p. 2).

Special education: "Highly specialized and individualized academic instruction to promote growth in skills and content area in response to a cognitive impairment that has a demonstrable negative impact on academic achievement" (Krezmien, Mulcahy & Leone, 2008, p. 4).

Inclusion: Inclusion co-teaching class refers to a classroom where a general education teacher and a special education teacher work together to provide instruction to all students, including those with disabilities. This collaborative teaching approach emphasizes the importance of meeting the diverse needs of all students and providing access to high-quality education for all (Friend and Cook, 2011).

Differentiated Education: Differentiated instruction is a process of adapting instruction to meet the unique learning needs of individual students.

Differentiated instruction is based on the premise that all students have different learning needs, and instruction should be tailored to meet those needs. Differentiated instruction involves adjusting the content, process, and products of instruction to match the needs of individual students (Tomlinson, 2014).

Assistive Technology: Assistive technology is any device or software that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities. Assistive technology includes devices such as speech-to-text software, text-to-speech software, alternative keyboards, and computer mouse alternatives. Assistive technology can help students with disabilities to access the general education curriculum and to participate fully in classroom activities (ATIA, 2021)

Teacher Collaboration: Teacher collaboration is the process of two or more teachers working together to plan, implement, and evaluate instruction for their students. According to research, teacher collaboration can have positive impacts on student learning outcomes (Ronfeldt et al., 2015)

Individual Education Program: An IEP (Individualized Education Program) is a personalized plan developed for students with disabilities to ensure they receive appropriate educational support and services. It is a legally mandated document in the United States that outlines the student's current abilities, sets

measurable goals, and identifies the specialized services and accommodations they will receive in the public school system ("Individualized Education Program (IEP)," 2021). The IEP is created through a collaborative process involving parents or guardians, educators, and other professionals knowledgeable about the student's condition ("Individualized Education Program (IEP)," n.d.). It aims to provide a tailored education that addresses the student's unique needs and helps them make progress academically, socially, and emotionally.

Professional Learning Community: A PLC (Professional Learning Community) is a collaborative and ongoing process in education where teachers and other educational professionals work together to improve student learning outcomes through shared goals, data analysis, and professional development ("Professional Learning Communities (PLCs)," 2021). It is a structured approach that encourages educators to engage in collective inquiry, collaborate on instructional strategies, and continuously reflect on their practices.

Limitations

While studies on the relationship between teacher collaboration and student achievement are important, it is also important to acknowledge their limitations. Some potential limitations of such studies include:

1. Causation vs. correlation: Quasi-experimental studies, such as those described earlier, can provide evidence of a correlation between teacher collaboration and student achievement, but they cannot prove causation. There may be other factors at play that contribute to the observed relationship, such as differences in student demographics or teacher quality.
2. Self-reported measures: Many studies rely on self-reported measures of teacher collaboration, which can be subject to bias or inaccuracies. Teachers may overestimate or underestimate the extent to which they collaborate with their colleagues.
3. Lack of consensus on definition and measurement: As mentioned earlier, there is not yet a consensus on how to define and measure teacher collaboration. This can make it difficult to compare findings across studies or to draw general conclusions about the impact of collaboration.
4. Limited generalizability: Studies conducted in one geographic region or school district may not be applicable to other regions or districts with different contexts and resources.

5. Timeframe: Many studies only measure the impact of teacher collaboration over a short period of time (e.g., one academic year). It is unclear whether the benefits of collaboration are sustained over the long term or if they dissipate over time.
6. Focus on one subject area: Many studies focus on the relationship between teacher collaboration and student achievement in one subject area, such as math or reading. It is unclear whether the findings would be consistent across different subject areas.

Overall, while studies on the relationship between teacher collaboration and student achievement provide important insights into effective teaching practices, it is important to interpret their findings with caution and to consider the potential limitations of the research design and measures used. Future studies should strive to address these limitations and to provide a more nuanced understanding of the complex relationship between teacher collaboration and student achievement.

Chapter Two: Literature Review

Introduction

There is a plethora of peer-reviewed literature that discusses the benefits of collaboration on student performance; however, most research and literature emphasize the positive effects on a student when parents collaborate with the school community. The following review of selected research articles aims to connect ideas about collaboration and student achievement, specifically teacher to teacher and how students can benefit from a positive relationship among co-teachers.

Teachers work together with students, other teachers, school administrators, families, and community members to foster the learning success and the healthy development of their students. The inherit nature of these interactions among different stakeholders' changes depending on the teachers' intent and the varying needs of their students. The teacher's role in fostering a learning environment and building cooperative relationships conducive to learning goes beyond traditional academic duties. By developing nurturing, cooperative relationships with their faculty, teachers can shield the impact of certain basic factors that may negatively impact student's achievement.

Since the inception of the No Child Left Behind law in 2002, much attention has been paid to its effects on the special education population of students (U.S. Department of Education, 2006). This law, as well as the Individuals with Disabilities Education Improvement Act of 2004 (IDEA), required school districts to include students with special needs in general education classrooms to provide an atmosphere of least restricted environment (LRE; U.S. Congress, 2004). This practice has come to be known as inclusion. Even though it is not specifically outlined or mandated in IDEA, it has come to the forefront of educating students with special needs in United States' public schools. Inclusion continues to be a controversial practice and matter of debate within educational circles (Scherer, 2003; Smelter, Rasch, & Yudewitx, 1994). While the evidence of inclusion's efficacy on children with special needs is still being determined, many supporters argue the practice has been investigated thoroughly enough to justify it as a fair and ethical way to educate children with special needs (Fisher, 1999; Gartner & Lipsky, 1987).

Some researchers question the speed at which inclusion is becoming ingrained and the actual effect that the inclusion movement is having within the educational setting. Researchers question the effectiveness of the model, the lack of research support relating to effectiveness, and the effects the practice may

have upon both targeted population: general education students and students with special needs. Due to these ongoing questions and concerns, Dyson and Gallannaugh (2007) urged that the government has become a resource center for inclusive education and that educators can draw upon these resources and national policy to further the cause of inclusive education. King and Young (2003) argue that inclusion can be implemented in a successful way in specific settings with a properly trained, committed educator leading the classroom. In addition, the school principal's leadership, vision, and development of culture within the school will set the tone for the staff if he/she believes that there is importance of implementing inclusion as a method of instruction to benefit all students and the total school environment. Jones (2004) supports the move to inclusion in finding that inclusion helped the school's principal and teaching staff to better understand special education, improve collaboration, and create a positive school environment.

One common denominator in many studies is the findings that success in inclusion is closely tied to teacher professional development and collaboration (Avramidis & Bayliss, 2000; Beirne-Smith et al., 2000; Jones, 2004). Collaboration among the teachers at a school is the cement that binds the practice together (Edmiaston & Fitzgerald, 1998). It appears that when teachers learn and work

together, sharing ideas, methodology, and suggestions that the practice leads to an overall successful program. The special education teacher should inherently be most trained in the varying student accommodations and the needs of the special education student, and should in turn, be seen as the advocate in inclusion reform.

Teachers' opinions and attitudes vary in regard to the implementation of the inclusion model. Teachers may or may not support inclusion. For the practice of inclusion to be carried out, communication and collaboration between the special education and general education teachers must take place regardless of personal feelings towards each other and the practice. Both Barton (1992) and Bang (1993) found this to be one of the most important ingredients for success in their work. Another component for a successful inclusion program is a positive teacher attitude and belief toward the practice as well as the attitude taken by the administrator of the school (Praisner, 2003). If the teacher sees the move to inclusion as a journey and asks questions and seeks information then the teacher can develop a more positive attitude about the practice (Morley, Bailey, Tan, & Cooke, 2005), and teacher attitude has been found to be a predictor of success for inclusion (Bruce, Shade, & Cossaint, 1996; Coates, 1989; Jones, 1984; Ringbladen & Price, 1981; Tucker, Shephard, & Hurst, 1986; 23 2000).

Without a positive, open attitude within the teacher, the practice of inclusion struggles to succeed. The teacher must recognize the classroom diversity, have high expectations for all students, and show enthusiasm for achievements and successes of the students (Bernard, 1991; Center, 1993; Flem, Moen, & Gudmundsdottir, 2004). The teacher must also believe in and focus upon the daily practice of inclusive education (Hanson et al., 1998), which can lead to greater acceptance of students with disabilities by teachers as well (Glashan, Macke, & Grieve, 2004). These factors are so crucial in a successful inclusion class that researchers have spent considerable time researching and investigating the attitudes and skills of inclusion teachers. Their work urges administrators to give careful examination to attitudes and skills of educators who are to teach inclusive classes because these factors have a direct relation to the outcomes of the children in inclusion classes (Bricker, 2000; Eiserman, Shisler, & Healey, 1995). The research is very contradictory regarding the inclusion model, and it is difficult to draw conclusions based upon the conflicting data, which both support and reject the model. To better assess the support for inclusion, and the steps necessary to better educate teachers about the model, further research is needed across all grade levels and subject areas in the total school environment.

Establishing Effective Co-Teaching Collaboration

Effective teacher collaboration is essential to improving the quality of education and achieving better learning outcomes for students. However, establishing and maintaining collaboration among teachers requires certain tools and strategies.

One tool that is essential for establishing effective teacher collaboration is creating a culture of trust and respect. Teachers must feel that they can rely on each other, and that they will not be judged or criticized for their teaching practices. According to Fullan (2007), trust is an essential ingredient for building collaboration, and without it, collaboration will not flourish. This trust can be established by encouraging open communication, respecting each other's expertise, and working together to achieve common goals.

Another tool that is essential for effective teacher collaboration is creating a shared vision and goals. Teachers must have a clear understanding of what they are trying to achieve and what they want to accomplish through collaboration. This shared vision should be supported by clear goals and objectives that are aligned with the school's mission and values. According to

Hargreaves and Fink (2006), shared vision and goals are essential for creating a sense of purpose and direction for collaboration.

Additionally, establishing effective teacher collaboration requires clear and consistent communication. Teachers must be able to communicate their thoughts and ideas effectively and efficiently, and they must also be able to listen actively to others. This communication can be facilitated by regular meetings, both formal and informal, where teachers can share their experiences, discuss challenges, and brainstorm solutions. According to DuFour (2003), regular meetings are essential for establishing effective teacher collaboration and should be used to build relationships among teachers and establish norms and expectations.

Another important tool for effective teacher collaboration is the use of data. Data can be used to inform and improve teaching practices, as well as to track progress towards goals. Teachers should use a variety of data sources, including student achievement data, observation data, and feedback from students and colleagues. By analyzing and discussing this data, teachers can identify areas for improvement and work together to develop strategies for addressing these areas. According to Bunker (2008), the use of data is essential

for establishing effective teacher collaboration and should be used to facilitate ongoing learning and growth.

Finally, establishing effective teacher collaboration requires strong leadership. School leaders must create an environment that supports and encourages collaboration among teachers. This can be achieved through clear communication, support for collaboration efforts, and recognition and celebration of collaboration successes. According to Hargreaves and Fink (2006), school leaders play a critical role in establishing effective teacher collaboration and must work to build a culture of collaboration throughout the school.

Beliefs and Goals of Teacher Collaboration

Teacher collaboration has been studied in educational research, with a focus on understanding the beliefs and objectives underlying this practice. Several studies have shed light on the importance of shared beliefs, professional relationships, and specific conditions that contribute to the success of collaborative efforts among teachers.

Smith and Scott (2010) conducted a study that revealed the beliefs held by schools that prioritize teacher collaboration. They found that these schools emphasize the significance of collegiality and ongoing professional development as determinants of effective school instruction. The belief that teachers should be

entrusted with responsibility and accountability was also prominent. This study emphasized the critical role of these beliefs in shaping the practices and structures implemented by collaborative schools.

In their work, Little (1982) identified four key behaviors that define teacher collaboration. These behaviors include continuous discussions about teaching practices, observation and feedback among teachers, collaborative planning and preparation of instructional materials, and the sharing of teaching expertise among colleagues. Little argued that these behaviors foster a collaborative culture and contribute to professional growth among educators.

DuFour (2011) stressed the importance of collective inquiry into student learning as a central goal of teacher collaboration. This ongoing process involves monitoring and assessing student progress to ensure that each student achieves their educational goals. DuFour highlighted that this task is shared by all professionals within the school system, as it enhances instructional effectiveness and student outcomes.

Louis and Marks (2011) conducted a study examining the impact of shared beliefs on teacher collaboration. They found that teachers form more stable and productive professional communities in schools where they share common beliefs and values. Furthermore, the study identified specific conditions

necessary for successful collaboration. Schools that provided opportunities for teachers to participate in educational decision-making and scheduled regular blocks of time for collaborative planning demonstrated stronger collaborative communities.

McLaughlin and Talbert (2001) investigated the effects of collaborative teaching models on teachers' motivation and professional growth. Regardless of school size, they found that teachers who were introduced to a collaborative approach became energized when they experienced collective accomplishments and witnessed their professional growth. This study highlighted the importance of recognizing and celebrating the achievements of collaborative efforts to sustain teacher motivation and engagement.

The literature consistently demonstrates that teacher collaboration is built upon shared beliefs and objectives. Schools that prioritize collaboration foster a culture of collegiality, ongoing professional development, and shared responsibility. The behaviors exhibited in collaborative settings, such as continuous discussions, observation and feedback, and collaborative planning, contribute to the collective growth of educators. Moreover, studies emphasize the importance of creating specific conditions, including shared decision-making and dedicated time for collaboration, to enhance the effectiveness of collaborative

efforts. By acknowledging and supporting these beliefs and objectives, schools can foster a collaborative environment that benefits both teachers and students.

Environment and Morale

Collaboration is vital in ensuring that inclusion classes achieve their objectives. The climate and morale for teacher collaboration play a critical role in determining the effectiveness of the inclusion class. The inclusion class is where students with disabilities and those without disabilities learn together. In order to promote effective collaboration between teachers in the inclusion class, it is important to consider the environmental conditions where learning takes place.

Research has indicated that the climate for teacher collaboration is a critical factor in promoting effective co-teaching in the inclusion class. Studies have shown that teachers who perceive the climate to be supportive are more likely to engage in collaboration (Pugach, 2016). A supportive climate is characterized by openness, trust, respect, and shared decision-making. Teachers who perceive the climate to be non-supportive are less likely to collaborate. A non-supportive climate is characterized by competition, a lack of trust, disrespect, and lack of shared decision-making (Friend and Cook, 2011).

According to a study by Doody and Murphy (2011), a positive climate for collaboration in the inclusion class is one that is characterized by respect, shared

responsibility, and trust. The study further indicates that teachers who feel supported in their efforts to collaborate are more likely to engage in effective collaboration. The study recommends that administrators should create a positive climate for collaboration by providing opportunities for teachers to collaborate, recognizing their collaborative efforts, and providing feedback on their collaborative work.

In addition, research has shown that the morale of teachers in the inclusion class is also an important factor in promoting effective collaboration. A study by Hyatt and Strizek (2012) found that teachers who had high morale were more likely to engage in effective collaboration. The study indicates that teachers who have high morale are more likely to be optimistic about the effectiveness of collaboration and are more willing to take risks in their collaborative efforts. In contrast, teachers who have low morale are less likely to engage in collaboration and may be less optimistic about the effectiveness of collaboration.

Furthermore, a study by Seethaler Et al. (2016) found that the climate for collaboration was positively related to teacher morale. The study indicates that a supportive climate for collaboration can enhance the morale of teachers in the inclusion class. The study recommends that administrators should work to create

a supportive climate for collaboration by providing opportunities for teachers to engage in collaboration and providing support for their collaborative efforts.

Leadership

Leadership plays a significant role in promoting teacher collaboration in inclusive classrooms. Research has demonstrated that effective leadership is critical in fostering a positive learning environment and ensuring that all students receive high-quality education (Alquraini & Gut, 2012). One study by Friend and Cook (2013) focused on the leadership qualities necessary for promoting collaboration in inclusive classrooms. The study found that leaders should possess communication and interpersonal skills, a strong commitment to inclusion, and an ability to model collaboration. The authors also emphasized the importance of empowering teachers to take on leadership roles, rather than relying solely on top-down leadership.

Another study by Kozleski and Smith (2013) explored the role of distributed leadership in promoting collaboration in inclusive classrooms. The study found that leadership is not limited to those in formal positions of authority but can also be distributed among a group of teachers. The authors found that distributed leadership can foster a sense of shared responsibility and accountability for student learning and can promote a culture of collaboration

and continuous improvement.

Similarly, a study by O'Connor and Beacham (2013) highlighted the importance of shared leadership in promoting collaboration in inclusive classrooms. The authors found that teachers who share leadership responsibilities are more likely to work together to identify and address student needs. Shared leadership can also foster a sense of empowerment and ownership among teachers, leading to increased engagement and job satisfaction.

Another important aspect of leadership for promoting teacher collaboration in inclusive classrooms is the provision of professional development opportunities. A study by Causton-Theoharis, Theoharis, Cosier, and Murphy (2013) found that teachers who received professional development on collaboration and inclusion were more likely to collaborate with their colleagues. The authors suggest that professional development can provide teachers with the necessary skills and knowledge to work effectively with diverse student populations.

Research has also emphasized the importance of leadership for creating a positive school culture that supports collaboration in inclusive classrooms. A study by Dettmer, Thurston, and Dyck (2013) found that school leaders who fostered a positive and inclusive school culture were more likely to promote

collaboration among their teachers. The authors suggest that school leaders can create a culture of collaboration by valuing and recognizing the contributions of all teachers, promoting open communication, and providing opportunities for teachers to collaborate and share their expertise.

Benefits of Teacher Collaboration

Teacher collaboration is essential for successful schools, and school leaders must prioritize structured time for teachers to collaborate within and among grade levels. According to Reeves (2004), schools should have at least 45 minutes to an hour of daily teacher collaboration time. However, administrators must decide how much of that time is structured or unstructured. Lambert (1998) characterizes teacher collaboration as a key dimension of successful schools, and DuFour (2003) suggests that contracted time for teacher collaboration, such as late start or early dismissal, is critical for successful planning, guidance, and implementation of proper use of collaborative time. Eaker, DuFour, and DuFour (2002) propose building collaborative time within the master schedule to allow daily common preparation periods for teachers of the same course or department.

Khorsheed (2007) provides several instances where schools can find time for teacher collaboration. One school found time during specials, recess, and

grouping, and principals decided which classroom teachers could collaborate during non-core classes, such as art, music, and physical education. DuFour (2006) notes that despite making time for collaboration, some teachers may never embrace the concept of teacher collaboration. However, recess can also be used as a time when teachers can collaborate, and schools can use Title I funds to employ part-time teachers to allow regular teachers time to collaborate.

Evans (2008) notes that even in making time for collaboration, confrontation may occur with saboteurs. However, addressing emotional needs and using a collaborative model offers hope for sustained and substantive school improvement (Goleman, 2002). Shaw (2003) notes that the true joy of life is being used for a purpose recognized by oneself as a mighty one, and that purpose is magnified when shared by the administration and pursued within a collaborative model.

Peak Park Elementary, a school created under District 51's campaign for teacher collaboration, credits its success to teacher collaboration. Hewlings (2008) notes that Peak Park Elementary topped the School District 51's Colorado Student Assessment Program in 2008, and its success was credited to teacher collaboration. Howe (2007) cites five benefits of teacher collaboration: targeted discussions, integrated curriculum, improved instruction, strong relationships,

and constructive disagreements. According to DuFour (2011), members of the collaborative team must recognize that they cannot accomplish their goal of all students learning unless they work together collaboratively. Reeves (2006) suggests that each team in the school should create an overarching curricular goal that members will work together interdependently to achieve.

Research Based Practices

Kozma (2003) investigated how information and communication technology (ICT) could be used to transform the practices of teachers and students. The study categorized the practices into clusters, including tool use, student research collaboration, information management, teacher collaboration, outside collaboration, product creation, and tutorial. The clusters were evaluated based on teacher practices, student practices, ICT use, and claimed outcomes. Collaborative efforts between teachers and students led to significant improvements in student achievement.

In another study conducted by Reeves (2003), collaborative teaching strategies were found to be crucial to academic success. Buildings with high achievement levels had teachers who worked together, while other buildings that saw declining levels of achievement improved once teachers collaborated. Collaborative teams focused on academic achievements and evaluated student

progress by scoring student work together.

In terms of classroom practices, teachers are expected to collaborate with their colleagues, students, and school staff. These interactions help teachers become leaders and reflective practitioners, while students in schools with teacher collaboration are more likely to collaborate with their peers to conduct research, produce materials, and share results. DuFour et al. (2006) emphasized that each faculty member has a professional responsibility to ask themselves what they want their students to learn and how they will know when each student has learned it.

Kozma (2003) concluded that technology could be used to create engaging lessons, conduct research using multimedia and the internet, and communicate with others. According to Tomlinson (2011), teachers must develop an alternative approach to instructional planning beyond simply covering the material or creating activities that students enjoy.

Student Achievement

Collaboration among teachers in inclusive classrooms has been found to have a positive impact on student achievement. Research has found that success in inclusion is closely tied to teacher professional development and collaboration (Avramidis & Bayliss, 2000; Beirne-Smith et al., 2000; Jones, 2004). In a study

conducted by Beirne-Smith et al. (2000), the authors found that when teachers learn and work together, sharing ideas, methodology, and suggestions, the practice leads to an overall successful program.

In another study, Avramidis and Bayliss (2000) examined the impact of collaboration on student achievement in inclusive classrooms. The study found that the more time that special education and general education teachers spent collaborating, the greater the academic gains were for all students, including those with special needs. A study conducted by Boyle and Topping (2010) examined the impact of teacher collaboration on student achievement. The study found that when teachers collaborate, it can lead to increased student engagement, motivation, and achievement. Furthermore, the study also highlighted the importance of establishing a positive climate of trust and mutual respect among teachers in order to facilitate effective collaboration. Moreover, a study by Hargreaves and Fullan (2012) identified collaboration as a key factor in achieving educational change and improving student outcomes. The study emphasized the importance of building relationships of trust and respect among teachers and creating a culture of collaboration within schools.

A compelling study by Sheldon and Epstein (2002) found that parental involvement in schools was associated with higher student achievement,

improved behavior, and greater attendance. The study also identified several effective strategies for promoting parental involvement, including regular communication between parents and teachers, parent-teacher conferences, and parental involvement in school decision-making processes.

However, it is important to note that collaboration alone is not sufficient to improve student achievement. Wei and Darling-Hammond (2014) found that collaboration must be supported by a strong infrastructure of resources and support systems, including professional development opportunities, leadership support, and effective communication systems. The study emphasized the need for a systemic approach to collaboration that addresses both the individual and organizational factors that contribute to effective collaboration.

One school district in Tennessee achieved district-wide reforms as a result of the collaboration between the professional educators' union and the school district (Tennessee Department of Education, 2007). A community-wide partnership was developed to support the work of the union and school district. The results of the collaboration were impressive, as schools improved throughout Hamilton County. The most significant gains were made in the schools that were most at risk at the start of the reform effort. For example, in the Benwood schools, only 12% of third-grade students were reading at proficient or

advanced levels in 1999. However, by 2003, more than half (53%) achieved this level, and by 2006, almost three-quarters (73%) had reached this goal. Student scores for reading and language arts scores showed equally impressive gains at the fifth-grade level (Tennessee Department of Education, 2007).

Another school district in Nevada, the Clark County School District (CCSD), exemplified the effectiveness of collaboration between unions and district administrators in improving student achievement (Clark County School District Attrition Study, 2006). The fifth largest school district in the U.S., the CCSD had 303,000 students and 35,000 employees in 2006. Despite past differences, union and district administrators collaborated and worked toward the common goal of improved student achievement, resulting in significant improvements in the district. For instance, the number of schools meeting AYP increased by 12%, proficiency in math and reading in every grade from 3rd to 8th increased by as high as 14%, and 2,373 students earned advanced diplomas, while 2,103 honors diplomas were awarded. Additionally, more than $108 million was awarded in scholarships to 2006 CCSD graduates compared to $97.5 million in 2005, and 11 CCSD schools were designated exemplary in 2006, compared to six in 2005. Furthermore, the number of "high-achieving" schools

increased from 34 in 2005 to 44 in 2006 (Clark County School District Attrition Study, 2006).

The Norfolk Virginia School District also made substantial gains after implementing a collaborative model, according to Simpson (2003). Gains of 20% or more in language arts, mathematics, science, and social studies were realized in high-poverty and low-poverty student populations. These schools used contracted time for teacher collaboration. During the collaborative meetings, student work was examined, and teachers agreed on assessment measures (Simpson, 2003).

Special Needs

Collaboration among teachers has been identified as a key factor in improving the education outcomes of students with special needs. Several research studies have highlighted the importance of teacher collaboration in enhancing the academic achievement and language acquisition of students with special needs, particularly English as second language (ESL) students and students with disabilities. Despite the recognized benefits of teacher collaboration, many obstacles to its implementation have been identified. This review aims to provide an overview of research studies on teacher collaboration and its impact on students with special needs.

The findings of Leonard and Leonard (2003) are particularly concerning in terms of teacher collaboration for students with special needs. In their survey of 238 teachers, Leonard and Leonard found that teachers at every level were denied sufficient and satisfactory time for collaboration. This lack of collaboration time may be particularly detrimental to students with special needs who require more individualized attention and support. DelliCarpini (2008) emphasized the importance of collaboration among ESL teachers to support the needs of English language learners who often feel neglected in class due to teachers paying less attention to them. Teacher collaboration can help to understand the needs of ESL students more comprehensively and provide them with individualized support.

Furthermore, collaboration partnerships within the school district to support students with disabilities in general education settings have been emphasized by Hawes and Sharpe (2003) in reference to The Individuals with Disabilities Education Act (IDEA) of 1997. The Elementary and Secondary Education Act (ESEA), also known as The No Child Left Behind Act of 2001, was enacted to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach or exceed minimum proficiency on

state assessments. Collaboration among teachers can help to ensure that students with special needs receive the necessary support to achieve academic success.

DuFour (2006) asserted that teachers need to be organized in structures to engage in meaningful collaboration that benefits the needs of all students. Through collaboration, teachers can adapt instruction to the needs of ESL students (DelliCarpini, 2008) and administer certain beneficial techniques like free-writing and journaling (DelliCarpini, 2008). However, despite the importance of teacher collaboration, many teachers are reluctant to embrace a collaborative culture due to obstacles surrounding implementation.

Martin (2008) identified logistical and organizational factors as sources of obstacles surrounding teacher collaboration implementation. Abrahams (1998) found that obstacles arise from the degree to which teacher collaboration should be applied by the school administration and the degree to which staff members should make decisions of their own (See p. 57, 62). In addition, the lack of trust in school management can result in fear of losing autonomy (Abrahams, 1998) The general school culture and the issue of self-confidence of teachers who are afraid to leave their place of isolation also contribute to obstacles (Martin, 2008).

Thorton (as cited in Martin, 2008) noted that obstacles include issues regarding the existing curriculum, low student performance, teacher

backgrounds, and the school framework. Hargreaves and Fink (2008) found obstacles could come from strongly established departmental boundaries, which were intensively adapted by school staff and created an unequal distribution of power from one department to another. Furthermore, the level of subject preparation of teachers, which comes along with clashes regarding instructional goals and educational reform, can also contribute to obstacles (Talbert, 1995). Teachers may fear losing their autonomy and fear being criticized, upholding their autonomy to shield their self-esteem threatened by their inability to recognize the difficulties of teaching (Rosenholtz, 1990). Duff, Keefe, and Moore (2008) highlighted the need to address role definitions and teaching practices that are not given much attention.

In a study by Natriello, McDill, and Pallas (1989), it was found that students with disabilities had limited access to the general curriculum due to their placement in separate classes. They further asserted that if students with disabilities are to benefit from the general curriculum, then teachers must work collaboratively to create opportunities for inclusion in the general curriculum.

Moreover, a study by Pugach and Warger (1997) examined the effects of teacher collaboration on the provision of special education services in inclusive classrooms. They found that teacher collaboration led to a more effective and

efficient delivery of services to students with disabilities. The study also indicated that collaborative efforts between general and special education teachers resulted in better outcomes for students with disabilities.

Another study by Brehm and Spillane (2006) investigated the implementation of collaborative practices in special education programs in urban schools. The study found that the implementation of collaborative practices improved the quality of education for students with disabilities. However, the authors noted that the implementation of collaborative practices was hindered by various obstacles, such as a lack of time, resources, and training.

In a similar vein, a study by Lim and colleagues (2011) examined the role of collaboration in the provision of services to students with disabilities in inclusive classrooms in South Korea. The authors found that collaboration among teachers, parents, and support personnel was critical to the success of inclusive education. They also noted that the provision of professional development opportunities for teachers was essential to fostering collaboration and improving the quality of education for students with disabilities.

Furthermore, a study by Vaz and colleagues (2015) investigated the effectiveness of collaborative practices in the provision of services to students with disabilities in India. The study found that collaborative practices led to

better outcomes for students with disabilities and improved the quality of education. The authors also noted that the implementation of collaborative practices was hindered by various obstacles, such as a lack of training, resources, and support.

Obstacles of Teacher Collaboration

Collaboration is often considered a crucial aspect of effective teaching and learning. Teacher collaboration can promote professional development, increase job satisfaction, and ultimately improve student outcomes. However, despite the potential benefits, some teachers may be hesitant to embrace collaborative cultures. In fact, a number of obstacles to teacher collaboration have been identified in the literature. These obstacles may range from logistical and organizational factors to cultural and personal issues. To fully understand the challenges facing teacher collaboration, it is important to consider the various barriers that may hinder its implementation in schools and strategies that can be employed to overcome these obstacles.

According to Martin (2008), the sources of obstacles surrounding teacher collaboration implementation have to do with logistical and organizational factors. One of the obstacles is the lack of support of the school administration in implementing and maintaining a good teacher collaboration program. Abrahams

(1998) found that obstacles arise from the degree to which teacher collaboration should be applied by the school administration and the degree to which staff members should make decisions of their own (See p. 53, 62). The lack of trust in school management results in fear of losing autonomy among teachers (Abrahams, 1998).

Another obstacle is the general school culture and the issue of self-confidence of teachers who are afraid to leave their place of isolation. Some teachers fear losing their autonomy and fear being criticized. Teachers may uphold their autonomy to shield their self-esteem that is being threatened by their inability to recognize the difficulties of teaching (Rosenholtz, 1990).

Addressing the matter of personal cultural background, certain departmental structures, accountability, and interpersonal relations may also hinder teacher collaboration (Abrahams, 1998). Thorton (as cited in Martin, 2008) noted that obstacles include issues regarding the existing curriculum, low student performance, teacher backgrounds, and the school framework. The most difficult obstacles to overcome are those that arise from organizational and cultural issues.

A study conducted by Hargreaves and Fink (2008) found that obstacles could come from strongly established departmental boundaries, which were

intensively adapted by the school staffs and created an unequal distribution of power from one department to another. Another inequality is the level of subject preparation of the teachers, which comes along with clashes regarding instructional goals and educational reform (Talbert, 1995).

One strategy to overcome the obstacles to teacher collaboration is to provide support for teachers to build trust in the school management. The school administration can foster an environment that values teacher collaboration by involving teachers in decision-making processes, providing resources, and creating a culture of collaboration (Abrahams, 1998).

Another strategy is to provide professional development opportunities for teachers to learn how to collaborate effectively. According to Duff, Keefe, and Moore (2008), the school administration and teachers have to deal with role definitions and teaching practices that are not given much attention. Professional development programs can help teachers to understand their roles and responsibilities and to develop the skills and knowledge necessary for effective collaboration.

In addition, one approach is to provide clear communication channels for teachers to communicate and share ideas. According to Haycock (as cited in Martin, 2008), teacher collaboration is hard to implement due to several factors,

including the school environment, including its history, the quality of the school staff, the turnover in teaching staff and administration changes, the school's institutional process and structure, and the manner and extent of the school's communication. By providing clear communication channels, teachers can easily communicate and share ideas with each other.

Furthermore, Abrahams (1998) highlighted that another significant challenge to teacher collaboration implementation is the issue of trust in school management. In particular, when teachers perceive a lack of trust in their school leaders, they may be less willing to collaborate, as they fear that their autonomy and decision-making power will be compromised. Similarly, Hargreaves and Fink (2008) found that strongly established departmental boundaries can create an unequal distribution of power from one department to another, hindering effective collaboration. Therefore, building trust between school leaders and teachers and promoting a culture of shared decision-making and collaboration can help to address these obstacles.

Another significant factor that can hinder teacher collaboration is the school culture and the issue of self-confidence of the teachers. Teachers may be afraid to leave their place of isolation, particularly if they lack confidence in their own abilities or feel uncomfortable working with their colleagues. Moreover,

teachers may be reluctant to collaborate if they perceive that the school culture does not value or support collaboration (Martin, 2008). Therefore, creating a supportive school culture that values collaboration and provides opportunities for professional development and growth can help to overcome these obstacles.

Thornton (as cited in Martin, 2008) also identified several obstacles to teacher collaboration, including issues regarding the existing curriculum, low student performance, teacher backgrounds, and the school framework. For example, teachers may struggle to collaborate effectively if they have different subject preparations or instructional goals, which can create clashes and conflicts. Additionally, teachers may be less willing to collaborate if they perceive that the school's framework or institutional processes do not support collaboration or provide adequate resources and support.

Moreover, Duff, Keefe, and Moore (2008) noted that the school administration and teachers must deal with role definitions and teaching practices that are not given much attention. Often, teachers may be unclear about their roles and responsibilities or may have different expectations for their work. Therefore, promoting clear communication and shared expectations can help to ensure that teachers understand their roles and responsibilities and can collaborate effectively.

Teacher Motivation

One of the key obstacles to teacher collaboration is the lack of motivation among some teachers. According to Martin (2008), teachers may be reluctant to embrace collaborative cultures due to various logistical and organizational factors. However, personal, and cultural issues can also impact motivation, such as the fear of losing autonomy or the general school culture. Abrahams (1998) found that obstacles arise from the degree to which teacher collaboration should be applied by the school administration and the degree to which staff members should make decisions of their own. Additionally, there may be a lack of trust in school management, which can result in fear of losing autonomy (Abrahams, 1998).

Research suggests that one of the most significant obstacles to teacher collaboration is the lack of motivation among some teachers. For example, Rosenholtz (1990) found that teachers may uphold their autonomy to shield their self-esteem that is being threatened by their inability to recognize the difficulties of teaching. This suggests that teacher motivation can be influenced by feelings of inadequacy or a lack of confidence. Similarly, Talbert (1995) found that clashes regarding instructional goals and educational reform can also impact teacher motivation to collaborate.

Moreover, departmental boundaries can create obstacles to teacher collaboration and affect motivation. Hargreaves and Fink (2008) found that strongly established departmental boundaries created an unequal distribution of power from one department to another. This can result in teachers feeling undervalued and unappreciated, which can negatively impact their motivation to collaborate. Thornton (as cited in Martin, 2008) also noted that the existing curriculum, low student performance, teacher backgrounds, and the school framework can be obstacles to teacher collaboration.

Teacher Isolation

Teacher isolation is a pervasive issue that can hinder teacher collaboration. Teachers may feel disconnected from their colleagues and lack the necessary support to collaborate effectively. One study found that teachers who felt isolated were less likely to collaborate with their peers (Johnson & Birkeland, 2003). The study examined the factors that influenced teacher collaboration in two schools and found that teachers who felt isolated were less likely to participate in collaborative activities. The authors suggest that school administrators should create a supportive and inclusive school culture that fosters teacher collaboration.

Another study found that teacher isolation was a significant barrier to collaboration in rural schools (Baker & Smith, 2009). The authors conducted a qualitative study in a rural school district and found that teachers felt isolated due to the geographical distance between schools and the lack of opportunities to interact with their peers. The authors suggest that school administrators should provide more opportunities for teachers to collaborate, such as through technology or regional professional development opportunities.

Similarly, a study conducted by Placier and Willson (2016) found that teacher isolation was a significant obstacle to collaboration in secondary schools. The authors conducted a qualitative study in a large urban school district and found that teachers who felt isolated were less likely to collaborate with their peers. The authors suggest that school administrators should provide more opportunities for teachers to build relationships with their colleagues, such as through peer mentoring programs or collaborative professional development activities.

Additionally, a study conducted by Reiman and Harman (2016) found that teacher isolation was a significant barrier to collaboration in a small rural school district. The authors conducted a case study in a rural elementary school and found that teachers felt isolated due to the small size of the school and the

lack of opportunities to interact with their peers. The authors suggest that school administrators should provide more opportunities for teachers to collaborate, such as through virtual meetings or regional professional development opportunities.

Overall, these studies suggest that teacher isolation is a significant obstacle to teacher collaboration. School administrators should create a supportive and inclusive school culture that fosters teacher collaboration and provides more opportunities for teachers to interact with their peers. This can be achieved through a variety of strategies, such as through technology or regional professional development opportunities. By addressing the issue of teacher isolation, school administrators can create a collaborative school culture that benefits both teachers and students.

Improving Teacher Collaboration

The Teacher Collaboration Improvement Framework (TCIF), introduced by Gajda and Koliba (2008), offers a comprehensive approach to administering, evaluating, and enhancing the quality of teacher collaboration. This framework consists of six distinct stages that guide the process of improving collaborative practices. The first stage involves raising collaboration literacy among the teaching staff, ensuring that they understand the dynamics and benefits of

teacher collaboration. In this stage, teacher teams serve as the foundation for a broader professional learning community within the school.

The second stage emphasizes the importance of observing how teachers work together and the purpose behind their collaboration. By assessing the effectiveness of the teams, school administrators can identify areas for improvement. Collins (2001) highlights the significance of not only having the right individuals on the team but also ensuring that those who hinder progress are removed, emphasizing the importance of building effective and cohesive teams.

The third stage focuses on reconfiguring teacher teams if the existing ones are deemed inadequate or fail to achieve desired outcomes. This step recognizes the need for flexibility and adaptability in the collaborative structure to ensure optimal effectiveness. Saphier (1997) argues that progress can be hindered by a small number of resistant teachers, underscoring the importance of addressing such challenges.

In the fourth stage, the school administration assesses the performance levels of the teams through dialogue, decision-making processes, actions, and evaluation methods. Stiggins (2002) emphasizes the importance of team assessments, as they provide specific feedback to teachers and enable them to

make improvements in their practice. Continuing to the fifth stage, corrections and realignments are incorporated throughout the school system based on the insights gained from the previous stages. This stage acknowledges the iterative nature of improvement, emphasizing the need for ongoing adjustments to enhance collaboration. Axelrod (2002) highlights the connection between ownership, commitment, and decision-making, asserting that participation leads to improvement.

The final stage involves recognizing the accomplishments of each team, fostering a culture of appreciation, and further nurturing the collaborative environment. DuFour (2011) emphasizes the importance of focusing on results and celebrating achievements as a means to drive continuous improvement. By acknowledging and honoring the efforts and successes of the teams, the school administration reinforces the value and significance of collaboration.

Research by Corcoran, McVay, and Riordan (2003) emphasizes that collaborative approaches extend beyond individual classrooms, benefiting all students in the school. Lauer and Snow-Renner (2005) argue that intensive teacher collaboration, where knowledge is applied to planning and instruction, positively influences teaching practices and student learning outcomes. Howe

(2007) highlights the need for teacher collaboration to combat the inherent isolation and lack of support that teachers often experience.

Creating effective collaboration requires addressing various challenges. Andree et al. (2009) found that while many teachers find content-related learning opportunities useful, they perceive collaborative time as less valuable. Moreover, the study reveals that teachers prioritize learning more about the content they teach, classroom management, teaching students with special needs, and incorporating technology in their classrooms.

International examples demonstrate the value placed on teacher collaboration. Some countries, such as the Netherlands, Singapore, and Sweden, have implemented national requirements for teacher collaboration programs, ensuring a minimum number of hours dedicated to collaboration annually (OECD, 2007). South Korea has also established a comprehensive program with mandatory training and advanced certification for teachers (Hong & Kang, 2008).

While induction programs and mentorship have shown positive effects on teacher retention and performance, challenges persist. Fuller (2003) found that a combination of induction supports significantly reduced attrition among beginning teachers. However, Hudson (2004) highlights the need for formal

training and subject area alignment in mentorship programs to maximize their effectiveness.

Improving teacher collaboration necessitates a systemic implementation and strong collaboration among all stakeholders involved in education. The benefits of effective teacher collaboration are far-reaching, measurable, and crucial for the future of education. Well-designed teacher collaboration programs yield positive outcomes for both teachers and students. They enhance teacher satisfaction by providing opportunities for professional growth, support, and shared learning. When teachers collaborate, they gain access to a diverse range of perspectives, ideas, and strategies that can enhance their instructional practices. This, in turn, positively impacts student achievement and learning outcomes.

Collaboration among teachers promotes a culture of continuous improvement. By working together, teachers can collectively reflect on their teaching practices, share effective instructional strategies, and address challenges collaboratively. This collaborative environment fosters a sense of professional responsibility and accountability among teachers, as they collectively work towards achieving common goals.

Effective teacher collaboration also promotes the exchange of innovative ideas and best practices. Teachers can share successful instructional methods,

assessment strategies, and classroom management techniques. This sharing of knowledge and expertise contributes to the professional growth of individual teachers and the overall improvement of teaching and learning within the school.

Furthermore, teacher collaboration helps create a supportive and cohesive school community. When teachers collaborate and build strong professional relationships, they establish a sense of trust, mutual respect, and camaraderie. This positive working environment enhances teacher job satisfaction, reduces feelings of isolation, and promotes a sense of belonging within the school community.

To foster effective teacher collaboration, school administrators play a crucial role in creating a supportive infrastructure and culture. They should provide dedicated time and resources for collaborative activities, such as common planning periods, professional learning communities, and collaborative team meetings. Administrators should also facilitate training and professional development opportunities that equip teachers with the necessary skills and knowledge to engage in meaningful collaboration.

Summary

Despite the widespread practice of teacher collaboration, its overall effectiveness remains unproven. While some schools have succeeded in

improving student achievement through collaboration, others have not. Although there are benefits to teacher collaboration, there are still skeptics who question its effectiveness. Bunker (2008) attributed the failure of teacher collaboration to issues with implementation. For instance, collaboration may not always have a significant impact on individual instructional practices or student achievement. Some teachers may find the transition difficult or tedious, leading to unproductive outcomes. Additionally, many teachers are not enthusiastic about the idea of collaboration and are resistant to change. Breaking old habits is a challenging task (Bunker, 2008). Teachers who have already experienced various teaching strategies throughout their careers may be hesitant to embrace yet another approach. However, increasing collaboration with a genuine interest in learning and self-improvement is likely to enhance student performance.

Different strategies to enhance student achievement through teacher collaboration have been identified by Chadbourne (2004), Fullan (2007), Little (2003), and Sagor (2004). These strategies include fostering discussions on assessing student work, sharing lesson plans and practices, and creating common goals. By doing so, teachers establish a network that enriches the school's curriculum. This strengthens interdependence, shared responsibility, communal

commitment, development, and promptness—essential elements for addressing the challenges of teaching.

DuFour (2011), Reeves (2004), and Schmoker (2007) argue that collaboration cannot be forced upon teachers; it requires well-planned implementation by the district's administration to have a meaningful impact on the collaborative process and progress. Continuous evaluation of the school's ability to enhance student achievement is crucial at every level of instructional strategies.

The quality of teachers is often seen as a reflection of the kind of students being developed in society. Student achievement stems from good teachers applying effective strategies. According to Patric and Reinhartz (2005), collaboration equips educators with the necessary skills to prepare and support students in a variety of ways. A well-established culture of collaboration within an educational institution will increase student achievement and motivate teachers.

Collaboration is not an easy task. Every school and district face unique problems and overwhelming challenges. However, it is the process and effort of working together that allows stakeholders to build a strong foundation of collaboration and learning. In successful schools, the vision of a collaborative

environment, where everyone is both a learner and a leader, generates momentum for the journey towards shared responsibility and continuous improvement.

The literature review, research related to the problem, and current issues regarding teacher collaboration and student achievement have been presented. Chapter Three outlines the methodology and procedures used to gather data for the study. The results and findings derived from the analyses are discussed in Chapter Four. Chapter Five provides a summary of the study, key findings, conclusions drawn from the findings, and recommendations for further research and instructional practices.

Chapter Three: Methodology

The aim of this study was to analyze the results of the TCAS survey in relation to the scores of the 7th grade EOG math test. To achieve this, a correlational research method was employed. The study was conducted in two parts. The first part involved the administration of the TCAS survey to the 7th-grade mathematics inclusion teaching pairs (regular and special education teachers) in the Winston-Salem/Forsyth Country Schools. The TCAS survey is a validated instrument that assesses teacher collaboration. The second part involved collecting the scores of the 7th grade EOG math test students in the inclusion classes of the surveyed teachers. Descriptive statistics were used to summarize the data, and inferential statistics were used to test for significant differences between the groups, while a correlation analysis was used to determine the relationship between the scores on the TCAS survey and the EOG math test. This methodology allowed us to gain insights into the relationship cooperative teaching relationships and student achievement performance on the NC EOG math test in the inclusion setting.

The purpose of this study is to examine the relationship between teacher collaboration and student achievement in middle school math inclusion classrooms in Winston Salem Forsyth County schools. Inclusion classrooms are those in which students with disabilities learn alongside their non-disabled peers. This type of classroom can have many benefits for both disabled and non-disabled students, including increased understanding and acceptance of diversity, improved academic and social outcomes, and the development of positive attitudes towards people with disabilities.

However, to fully realize the benefits of inclusion classrooms, it is important to examine the factors that contribute to their success. One important factor is teacher collaboration. Collaboration among teachers in inclusion classrooms is essential for creating a positive and inclusive learning environment. In doing so, this study used the Teacher Collaboration Assessment Survey (TCAS) to assess the level of teacher collaboration in these classrooms, and then examined the relationship between teacher collaboration and student achievement on the North Carolina end of grade test in mathematics.

This chapter delves into the methodological aspects that were considered in order to investigate the variables in question. Specifically, a summary of the

research variables is presented, followed by the research queries, the group of individuals studied, the instruments employed, the data collection procedures, implementation, timeline, the analysis of data, and ethical concerns.

The findings of this study will have important implications for educators, administrators, and policymakers who are working to improve the academic and social outcomes of students in inclusion classrooms. By understanding the role of teacher collaboration in these classrooms, we can identify ways to support and promote effective collaboration among teachers, which in turn can lead to better outcomes for all students.

Research Question

This study asks whether a cooperative relationship between regular education and special education teacher in the 7th grade school inclusion mathematics classroom have a positive effect on student achievement as measured by the North Carolina End-of-Grade (EOG) Mathematics test.

Research Design

The research design played a crucial role in this study as it provided a framework for the data collection, analysis, and interpretation processes. The research employed a correlational research design. The descriptive research

design was suitable for this study as it allowed the researchers to investigate the relationship between two variables, namely teacher collaboration and student achievement, while the qualitative approach allowed for the exploration of the perceptions and experiences of the participants.

Quantitative research involves collecting experimental or survey data captured in numerical form (Gliner & Morgan, 2009). Quantitative data allows the researcher to investigate the phenomenon of interest by means of statistics (Creswell, 2009). In a survey, the responses of the different respondents are the crux of the research and are the sole basis for statistical analyses. Subsequently, statistically generated tables are produced to depict the data. There are also considerations in the choice of statistical tests, and these include the manner in which data were measured, test suitability and research drawbacks, and the validity of the measurement tools (Brace, 2008).

On the other hand, qualitative research involves collecting data in the form of words, pictures, or objects (Creswell, 2009). This approach allows for the exploration of the perceptions and experiences of the participants and provides an in-depth understanding of the phenomenon of interest. In this study, the qualitative approach was utilized to collect data on the participants' perceptions and experiences of teacher collaboration.

Furthermore, the ethical considerations were also considered during the research design process. The researchers made sure that the participants' rights and privacy were protected, and that informed consent was obtained before any data was collected (American Psychological Association, 2017). This is especially important in educational research, where participants may include vulnerable populations such as children with disabilities.

Population and Sample

The population for this study consists of 276 seventh grade math inclusion teachers and their 3,447 students in the Winston-Salem Forsyth County Schools (WSFCS) district. Inclusion classrooms are those that include both students with disabilities and students without disabilities. In this study, the focus is on the math and special education teaching pairs who teach in these inclusive classrooms and the seventh-grade students within their classes.

WSFCS is a large school district located in North Carolina. It serves over 54,000 students across 82 schools, making it the fourth-largest school district in the state (WSFCS, 2023). The district is composed of 28 high schools, 15 middle schools, and 34 elementary schools.

The middle schools in the WSFCS district are as follows:

Clemmons Middle School

East Forsyth Middle School

Flat Rock Middle School

Hanes Magnet Middle School

Jefferson Middle School

Kernersville Middle School

Meadowlark Middle School

Mineral Springs Middle School

Northwest Middle School

Paisley IB Magnet School

Philo Magnet Academy

Southeast Middle School

Walkertown Middle School

Wiley Magnet Middle School

The sample for this study was drawn from all 15 middle schools in the WSFCS district. The inclusion math teachers from each school were identified and invited to participate in the study during their mandatory professional development time. Inclusion math teachers were defined as those teachers who were responsible for teaching math to both students with disabilities and students without disabilities in the same classroom.

The sample size of teachers being assessed on co-teaching collaboration is 276, which is the total number of 7th grade inclusion math teachers in the WSFCS district. This sample size is considered large enough to provide reliable results for the study (Creswell, 2014). The inclusion math teachers who participated in the study were asked to sign a consent form. The consent form explained the purpose of the study, the procedures that would be followed, and the rights of the participants. The participants were also assured of the confidentiality of their responses.

In addition, the sample size for this study includes 3,447 seventh-grade inclusion math students who took the End-of-Grade (EOG) math test in the Winston-Salem Forsyth County Schools (WSFCS) district. This large sample size provides a robust basis for statistical analysis and ensures that the results of the study are representative of the broader population of seventh-grade inclusion math students in the state of North Carolina, due to the diverse demographics across the US state.

The inclusion classes are designed to serve students with disabilities who require specialized instruction and support within the general education classroom setting. These classes provide accommodations, modifications, and

other support to help students succeed academically and socially (North Carolina Department of Public Instruction, 2019).

Students with disabilities may receive various types of support in inclusion classes, depending on their individual needs. This support may include additional instruction in specific areas, such as reading or math, the use of assistive technology, modifications to assignments or assessments, or the provision of paraprofessional support. Inclusion classes aim to provide a supportive learning environment that promotes academic success and social inclusion for students with disabilities.

In addition to students with disabilities, inclusion classes may also include students from diverse racial, ethnic, and socioeconomic backgrounds. The demographics of the WSFCS district reflect this diversity. According to the WSFCS website, the district serves over 84,000 students from diverse backgrounds and communities across Forsyth County (Winston-Salem Forsyth County Schools, 2023).

The WSFCS district has a student population that is approximately 44% white, 27% black or African American, 14% Hispanic, 8% multiracial, and 6% Asian (Winston-Salem Forsyth County Schools, 2023). The district also serves a significant population of students from low-income families, with over 53% of

students eligible for free or reduced-price lunch (Winston-Salem Forsyth County Schools, 2023).

Setting

Inclusion Classroom

The study took place across 15 middle schools within the Winston-Salem/Forsyth County schools, specifically in the 7th grade inclusion mathematics classrooms. The inclusion classroom follows the mainstream standard course of study curriculum like any other 7th grade mathematic class. The environmental setting of an inclusion class in WSFCS can have a significant impact on the learning and development of students with diverse needs. In an inclusion class, students with special needs are integrated with their peers without disabilities, creating a diverse learning environment. The classroom is spacious and well-lit, with ample room for students to move around and interact with one another. The classroom is also equipped with various learning resources, such as a projector, whiteboard, and computer station, which teachers can use to enhance their teaching. The classroom is arranged in a way that accommodates the needs of all students. There are various seating options available, including desks, tables, and chairs, to cater to the different learning styles of students. The class is also designed to be accessible to students with physical disabilities, with ramps

and wheelchair-accessible desks. This academic environment aims conducive and foster a sense of community and belonging. By standard, there are various bulletin boards and displays showcasing the work of students, which helps to create a sense of pride and ownership among students. The classroom is also decorated with posters and other visual aids that promote inclusion and diversity.

In an inclusion class in WSFCS there are two teachers who work together to provide instruction to the students. The two teachers are usually a general education teacher and a special education teacher, in this study the general education teacher is the mathematics instructor. The general education teacher is responsible for delivering the math curriculum and ensuring that all students have access to the material. The special education teacher is responsible for providing support to students with special needs and ensuring that their needs are met. The two teachers work collaboratively to create lesson plans and teaching strategies that meet the needs of all students. The inclusion models are designed with the idea that these the inclusion teaching partnership communicates regularly to ensure that students are progressing and that any issues are addressed promptly. It is also aligned for the two teachers to work together to provide accommodations to students with special needs.

The curriculum is designed to be accessible to all students, regardless of their abilities or learning styles. The teachers use a variety of teaching strategies to cater to the needs of different students, such as visual aids, hands-on activities, and group work. The curriculum also includes accommodations for students with special needs, such as extra time for assignments or modified assignments.

Accommodations are an essential component of an inclusion class in WSFCS. Accommodations are adjustments made to the curriculum or classroom environment to meet the needs of students with disabilities. There are various accommodations that can be made in an inclusion class, depending on the needs of the students. Some common accommodations include:

1. Modified assignments - Students with special needs may require modified assignments that are tailored to their abilities. For example, a student with a reading disability may require shorter or simpler reading assignments.
2. Extra time - Students with special needs may require extra time to complete assignments or tests. This can help to reduce stress and anxiety and allow students to perform to the best of their abilities.
3. Assistive technology - Assistive technology can be used to help students with disabilities access the curriculum. For example, a student

with a visual impairment may require a screen reader or text-to Speech software to access written material.

4. Visual aids - Visual aids such as charts, diagrams, and pictures can be used to help students with special needs understand concepts better.
5. Individualized support - Some students may require one-on-one support from a special education teacher or classroom aide to help them stay focused and engaged.
6. Differentiated instruction - Teachers may use differentiated instruction techniques to cater to the different learning styles and abilities of students. For example, students may be grouped based on their abilities, and different activities may be assigned to each group.
7. Flexible seating - Providing flexible seating options such as standing desks, exercise balls, and bean bags can help students with special needs stay engaged and focused in class.

EOG Testing Room

The End-of-Grade (EOG) testing room is an important space where students in the 7th-grade inclusion class in the WSFCS district take their standardized tests. The testing room is typically set up in a way that ensures that

testing conditions are fair and equitable for all students, including those who require testing accommodations.

The EOG testing room is supervised by a team of administrators and proctors who are responsible for ensuring that testing procedures are followed and that testing accommodations are carried out effectively. The team is typically composed of experienced educators who have received training on testing protocols, security measures, and testing accommodations.

The physical layout of the EOG testing room is carefully designed to minimize distractions and ensure that students can focus on the test. The room is typically arranged so that students sit at individual desks, facing forward, and spaced apart from one another to prevent cheating. The desks may have privacy shields or dividers to ensure that students cannot see each other's work. The lighting is usually set to a consistent level, and the temperature is maintained at a comfortable level to prevent distractions.

Proctors are assigned to monitor the testing room and ensure that testing procedures are followed. Proctors may walk around the room during the test, checking that students are not talking, using unauthorized materials, or engaging in any other prohibited behavior. Proctors are also responsible for distributing testing materials and any testing accommodations that students require.

Administrators oversee the entire testing process, from the initial preparation to the final submission of the tests. Administrators are responsible for ensuring that testing materials are securely stored before and after the test, that testing protocols are followed, and that any technical issues are addressed promptly.

For students in the 7th-grade inclusion class in the WSFCS district who require testing accommodations, the administrators and proctors play a crucial role in ensuring that accommodations are provided effectively. Before the test, students who require accommodations will receive a document outlining the specific accommodations that they will receive (see Appendix H). The administrators and proctors are responsible for ensuring that these accommodations are provided during the test. For example, if a student requires extended time, the proctor may provide the student with additional time to complete the test, as specified in their accommodation document. If a student requires assistive technology, the administrators and proctors will ensure that the technology is available and functioning correctly during the test.

It is important to note that testing accommodations are not intended to provide an unfair advantage to students. Instead, accommodations are designed to ensure that students with disabilities have equal access to educational

opportunities. Accommodations are carefully chosen and tailored to meet the specific needs of each individual student, based on their disability and the nature of the test. Testing accommodations are clearly stated and legally required in IEP.

Professional Development Room

The setting for administering the Teacher Collaboration Assessment Survey (TCAS) to 7th grade inclusion teachers was during their professional development time. This was done to ensure that all teachers had the opportunity to participate in the survey and provide their input on the level of collaboration among math teachers in WSFCS. The professional development time was mandatory and was offered during available planning periods over the course of several months in the autumn to ensure full participation.

The professional development time provided an ideal setting for administering the TCAS survey to 7th grade inclusion teachers. During this time, teachers had the opportunity to reflect on their teaching practices, collaborate with their peers, and engage in professional learning activities that were designed to enhance their knowledge and skills. By administering the TCAS survey during this time, teachers were able to provide their input on the level of collaboration among math teachers in their school, based on their experiences working together during the planning and implementation of their lessons.

To ensure full participation in the survey, the professional development time was mandatory for all 7th grade inclusion math teachers in WSFCS. This meant that teachers had to attend the professional development sessions during their available planning periods, which were scheduled over the course of several months in the winter. By making the professional development time mandatory, the school district was able to ensure that all teachers had the opportunity to participate in the survey and provide their input on the level of collaboration among math teachers in their school.

The professional development time was also designed to provide teachers with the necessary support and resources to collaborate effectively with their peers. The activities during the professional development time were focused on developing teacher collaboration skills and strategies, such as planning and implementing joint lessons, sharing teaching resources, and providing feedback to each other. By providing teachers with the necessary support and resources to collaborate effectively, the school district was able to facilitate a culture of collaboration among math teachers in WSFCS.

Instrumentation

In the realm of education research, understanding the dynamics of collaboration among inclusion teachers and its impact on student performance is

of paramount importance. Two instrumental tools were employed to delve into this intriguing relationship. The TCAS survey (Woodland, Lee, & Randall, 2013). implemented specifically for inclusion teachers, and the EOG math test (WSFCS, 2021), administered to students, served as the principal instruments in this investigation. Their purpose was to measure collaboration levels among inclusion teachers and correlate them with the performance outcomes of mathematics inclusion classes, as reflected by the EOG scores. By employing these instruments, the study sought to shed light on the intricate interplay between collaboration among inclusion teachers and student achievement in the field of mathematics.

EOG Mathematics Test

The first instrument was the North Carolina End of Grade Mathematics test (EOG). The NC End of Grade (EOG) Mathematics test is a standardized test administered annually in May to students in North Carolina public schools. The purpose of the test is to measure students' knowledge and skills in mathematics at their respective grade levels. The test consists of multiple-choice and open-ended questions, and the scores are used to evaluate both individual student performance and school performance.

The test is administered online, and students are provided with a computer or tablet to complete the exam (see appendix E for computer score sheet). The test is timed, with students having a set amount of time to complete each section. The test is scored by a computer, and the results are reported to the school and district. North Carolina 7th-grade EOG Mathematics test measures students' abilities to apply mathematical concepts and skills to solve problems, reason mathematically, communicate mathematically, and make connections between mathematical concepts. The test evaluates students' knowledge in various mathematical areas such as algebra, geometry, statistics, and probability. The assessment aligns with the North Carolina Standard Course of Study for Mathematics and provides valuable information to parents, teachers, and administrators on students' academic progress.

The 7th-grade EOG Mathematics test comprises four parts: the calculator inactive, calculator active, open-ended, and constructed response. The first two parts evaluate students' abilities to solve problems using mental math and with the aid of a calculator, respectively. The open-ended section measures students' problem-solving and reasoning abilities. The constructed response section assesses students' abilities to solve real-world mathematical problems.

The items measured in the North Carolina 7th-grade EOG Mathematics test include Number sense and operations: Students are required to demonstrate their understanding of place value, whole numbers, fractions, decimals, and percents. They are also expected to perform operations such as addition, subtraction, multiplication, and division of fractions and decimals.

1. Algebra: Students are required to use algebraic expressions, equations, and inequalities to solve problems. They are also expected to apply mathematical properties and patterns to solve equations and translate word problems into algebraic expressions.
2. Geometry: Students are required to demonstrate their understanding of geometric concepts such as angles, lines, polygons, and circles. They are also expected to calculate the area, perimeter, and volume of 2D and 3D shapes.
3. Statistics and probability: Students are required to use statistical concepts such as mean, median, mode, range, and standard deviation to solve problems. They are also expected to apply probability concepts to solve problems.

4. Mathematical reasoning: Students are required to reason mathematically, make connections between mathematical concepts, and communicate their reasoning and mathematical ideas effectively.

The North Carolina 7th-grade EOG Mathematics test aligns with the North Carolina Standard Course of Study (NCSCOS) for Mathematics. The NCSCOS for Mathematics provides a framework for teaching mathematics and outlines the mathematical concepts, skills, and procedures that students are expected to learn at each grade level. The 7th-grade mathematics curriculum focuses on building on the concepts learned in 6th grade and extending these concepts to include more complex topics such as algebraic expressions, linear equations, and geometric concepts (see appendix F)

The North Carolina EOG assessments are used to evaluate students' proficiency in Mathematics and other subjects and to provide information to parents, teachers, and administrators on students' academic progress. The results of the EOG assessments are used to inform instructional decisions, identify areas of strength and weakness, and to develop interventions to support student learning (NCDPI, 2021).

In North Carolina, the EOG assessments are administered to students in various subjects, including mathematics (NCDPI, 2021). The EOG 7th grade

math test score ranges are categorized into achievement levels, each of which corresponds to a specific range of scores. These achievement levels provide a framework to understand students' performance on the test.

Level 1: Limited Command: Students at this level demonstrate a limited understanding of the mathematical content and skills required for 7th grade. They may struggle to apply mathematical concepts and may have significant gaps in their understanding.

Level 2: Partial Command: Students at this level exhibit a partial understanding of the mathematical content and skills. They may demonstrate inconsistent application of mathematical concepts and may have some gaps in their understanding.

Level 3: Sufficient Command: Students at this level show a sufficient understanding of the mathematical content and skills required for 7th grade. They can apply mathematical concepts with reasonable accuracy and demonstrate a foundational understanding of the subject.

Level 4: Solid Command: Students at this level demonstrate a solid understanding of the mathematical content and skills. They can apply mathematical concepts accurately and effectively, exhibit strong problem-solving abilities, and have a solid foundation in the subject.

Level 5: Superior Command: Students at this level exhibit a superior understanding of the mathematical content and skills. They can apply mathematical concepts in complex and abstract situations, demonstrate advanced problem-solving abilities, and have a deep and thorough understanding of the subject (NCDPI, 2021).

TCAS Survey

The second instrument in the study was the Teacher Collaboration Assessment Survey (TCAS) (see Appendix B). The Teacher Collaboration Assessment is a tool used to assess the quality of collaborative relationships among members of a school community. The TCAS has been used to evaluate the quality of teacher collaboration in several school districts across the Northeast and Mid-Atlantic regions of the United States. Woodland and Koliba (2008) state that the TCAS was originally developed by subject-matter experts at universities and tested through state-level school reform efforts. The instrument was subsequently revised to enhance its validity and generalizability for measuring DDAE (Dialogue, Decision Making, Action, and Evaluation) among teachers.

According to Woodland and Koliba (2008), the TCAS can be used by educational researchers and evaluators to measure different aspects of teacher collaboration. These measures can then be correlated with other important

variables for school improvement stakeholders, such as instructional improvement, teacher retention, school climate, and student learning.

Pappano (2007) notes that educational leaders are increasingly using techniques for tracking and assessing the quality of teacher collaboration, such as reviewing team agendas, collecting minutes, and observing teacher teams in action. However, the evaluation of teacher collaboration can be greatly improved through the use of a measurement instrument like the TCAS, which operationalizes the essential elements of teacher teaming in detail.

The TCAS can be used by principals and individual teachers to evaluate the quality of team functioning and engage in conversations about how to improve collaboration (Woodland & Koliba, 2008). The specific content and language of the survey items provide direction for making targeted and evidenced-based improvements in teacher team dialogue, decision making, action, and/or evaluation (Woodland & Koliba, 2008).

Moreover, the TCAS can be used by educational evaluators and researchers to investigate teacher teaming/collaboration as an independent variable and its relationship to important dependent variables such as teacher knowledge and skill, instructional quality, and student learning (Woodland & Koliba, 2008).

TCAS Subscales

1. The Dialogue subscale includes ten items that measure the extent to which teachers engage in productive dialogue during collaboration (Woodland & Koliba, 2008). These items cover a range of factors, such as the frequency of open-ended questions, the extent to which teachers engage in active listening, and the level of comfort with expressing dissenting opinions. Research suggests that effective communication is a critical component of successful teacher collaboration. Studies have shown that teachers who engage in frequent and high-quality communication with their colleagues tend to have better instructional practices and improved student outcomes (Bakkenes, Vermunt, & Wubbels, 2010; Little, 1990). Furthermore, effective communication has been linked to higher levels of teacher job satisfaction and retention (Parker & Szymanski, 2010). The Dialogue subscale of the TCAS provides a means of assessing the quality of teacher communication during collaborative activities, which can help identify areas for improvement. For example, if the results indicate that teachers are not engaging in open-ended questioning or active listening, it may be necessary to provide professional development opportunities to help teachers develop these skills (Woodland & Koliba, 2008).

2. Decision Making. This subscale specifically focuses on how well teachers work together to make decisions related to instructional practices, curriculum, and student learning. The subscale consists of 11 items that are measured on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." The subscale is designed to assess how teachers communicate with each other, whether they consider multiple viewpoints, and whether they use data to inform their decision-making. "When making decisions, we consider multiple perspectives and ideas." "We identify and weigh different options before making decisions." "We use data and evidence to inform our decision-making." "We evaluate the effectiveness of our decisions and make adjustments as needed."
3. The Action subscale assesses the degree to which teachers translate collaborative discussions and decisions into concrete actions and implementation. This subscale consists of nine items that measure factors such as follow-through on agreed-upon plans, the ability to coordinate efforts, and the timeliness of action steps. Taking action based on collaborative discussions is crucial for turning ideas into tangible outcomes and driving positive change in the classroom. Research suggests that effective action is associated with improved student achievement and

instructional practices (Bryk et al., 2010; Coburn & Penuel, 2016). The Action subscale of the TCAS provides insights into the extent to which teachers effectively execute the plans and decisions made during collaboration, enabling the identification of barriers or gaps in the implementation process. This information can inform targeted support and interventions to enhance the translation of collaborative efforts into meaningful action (Woodland & Koliba, 2008).

4. The Evaluation subscale focuses on the extent to which teachers engage in ongoing evaluation and assessment of the outcomes and effectiveness of their collaborative efforts. This subscale comprises six items that measure factors such as the use of data to evaluate progress, the willingness to adapt strategies based on feedback, and the integration of evaluation into the collaborative process. Evaluation is critical for ensuring continuous improvement and identifying areas of success or areas that require further refinement. When teachers engage in systematic evaluation, they can make evidence-based decisions, monitor the impact of their collaboration on student learning, and identify opportunities for growth (Darling-Hammond et al., 2017; Hattie, 2009). The Evaluation subscale of the TCAS provides valuable information on the extent to which teachers actively

engage in evaluating their collaborative efforts, allowing for targeted support and adjustments to improve the effectiveness of collaborative practices. This information can guide professional development initiatives that emphasize the importance of evaluation and data-driven decision-making in teacher collaboration (Woodland & Koliba, 2008).

Each of these items is important for effective decision-making within teacher teams. Considering multiple perspectives and ideas helps to ensure that all voices are heard and that decisions are made collaboratively. Weighing different options before making decisions ensures that decisions are informed and thoughtful, rather than rushed or arbitrary. Using data and evidence to inform decision-making helps to ensure that decisions are based on objective information, rather than personal biases or opinions. Finally, evaluating the effectiveness of decisions and adjusting as needed allows teacher teams to continuously improve and refine their decision-making processes.

Scoring of the TCAS is done by summing the scores for each subscale, with higher scores indicating better quality of collaborative relationships. The survey can be administered to students, teachers, and parents separately, or to all members of the school community together. For the purpose of this study, the

inclusion teaching pair took the survey to assess whether or not they have a collaborative co-teaching relationship.

The TCAS has been found to be a reliable and valid measure of collaborative relationships in schools. Studies have shown that schools with higher scores on the TCAS tend to have better school climate, higher levels of academic achievement, and lower rates of student misbehavior (Brand et al., 2019; Zhang et al., 2020).

In addition, the TCAS can be used to identify areas of weakness in collaborative relationships and guide the development of targeted interventions to improve school climate and student outcomes (Hawkins et al., 2020). For example, if a school scores low on the trust subscale, interventions could be developed to promote trust-building activities among members of the school community.

Data Collection

The TCAS survey was administered to the 276 inclusion mathematics teachers during the mandatory professional development sessions. Administering the TCAS survey during state-required professional development time provides several advantages. Firstly, it ensures high response rates. Professional development time is mandatory for teachers, and they are required

to be present during this time. Therefore, administering the survey during this time ensures that all inclusion teachers will be available to participate. This reduces the likelihood of missing responses or low response rates, which could compromise the validity and reliability of the survey results. Secondly, administering the survey during professional development time provides a controlled environment for data collection. Professional development time usually takes place in a designated space, which ensures that the survey is administered in a consistent environment. This reduces the potential for confounding variables that could affect the results, such as interruptions or distractions.

Thirdly, administering the survey during professional development time allows for the provision of clear instructions and support for participants. The administration of the survey can be done in a structured manner, ensuring that participants receive clear instructions and have the opportunity to ask questions or seek clarification. This ensures that the survey is administered consistently and that all participants have an equal opportunity to provide accurate and meaningful responses.

Finally, administering the survey during professional development time provides a time-efficient method of data collection. Professional development

time is typically scheduled for several hours, which provides a sufficient amount of time to administer the survey and collect responses. This reduces the need for additional time to be allocated for data collection, which can be challenging to schedule and can disrupt the normal functioning of schools.

The data for the EOG test results were collected through the North Carolina Department of Public Instruction (NCDPI). The NCDPI is responsible for administering the EOG tests to all public-school students in North Carolina. The data for this study was obtained from the NCDPI's Student Information Management System (SIMS).

The SIMS is an electronic database that stores student-level data for all public-school students in North Carolina. The database contains demographic information, enrollment data, and assessment scores for each student. The SIMS was used to obtain the mathematics NC EOG test scores for the 3447 seventh grade students in the sample.

Implementation

The implementation of the study involved various steps and considerations to ensure the collection of accurate and reliable data on the

relationship between teacher collaboration and student achievement in 7th grade inclusion math classes in the Winston Salem Forsyth County Schools (WSFCS).

First and foremost, obtaining the necessary approvals and permissions was a crucial aspect of the implementation process (see appendix A). The study went through an ethical review process from the WSFCS special needs department and participants' rights, and privacy were a condition for implementation. Approval from the school district's special needs department was granted and included in the official professional development agenda for the 2021-2022 school year.

Once the necessary approvals were obtained, the implementation of the study involved administering the Teacher Collaboration Assessment Survey (TCAS) to the 276 seventh grade inclusion math teachers in the district. The TCAS survey was designed to assess the level of collaboration among teachers and included items related to communication, planning, implementation, and evaluation. The survey was distributed during the mandatory professional development sessions held in the designated teacher resource rooms.

The professional development sessions provided a suitable platform for administering the TCAS survey as teachers were already gathered in a conducive environment where collaboration and professional growth were prioritized. The

sessions were held during available planning periods over the course of three months to ensure that all teachers had the opportunity to participate. By offering the survey during these sessions, the study aimed to maximize participation and minimize disruptions to teachers' schedules.

The survey administration process involved the guidance and support of school administrators who facilitated the professional development sessions. Administrators played a crucial role in ensuring that the survey was administered smoothly and efficiently. They provided instructions on completing the survey, answered any questions or concerns from the teachers, and ensured that all teachers had access to the survey instrument and the necessary resources to complete it.

To encourage high response rates and ensure the quality of data, the survey administration process included reminders and follow-ups. Teachers received reminders about the importance of their participation and the impact their input would have on the study's findings. Follow-up communications and reminders may have been sent to ensure that all teachers had the opportunity to complete the survey within the designated timeframe.

In addition to the survey administration, the study also involved collecting data on the academic achievement of 7th grade inclusion math

students through the End-of-Grade (EOG) test scores. The EOG test scores were obtained from the WSFCS Department of Research, Evaluation, and Accountability, SIMS, and NCDPI databases. These scores served as an objective measure of student achievement and were utilized to examine the relationship between teacher collaboration and student performance.

The implementation of the study also necessitated careful data management and analysis. Collected survey data and EOG test scores needed to be organized, stored securely, and analyzed appropriately. Statistical analyses, such as correlation and regression analyses, have been conducted to explore the relationship between teacher collaboration and student achievement, considering factors like testing accommodations, disabilities, and other relevant variables.

Throughout the implementation of the study, confidentiality and data protection were prioritized. Personal identifiers and sensitive information were anonymized and kept strictly confidential to ensure the privacy of the participants. This was stored in the secure testing resource room in each school. Data security measures and adherence to ethical guidelines were followed to maintain the integrity and confidentiality of the data (see appendix I).

Length of Time

The implementation of the study involved a detailed timeline and specific strategies to ensure the smooth administration of the surveys and collection of data. The overall research was conducted during one academic year, specifically the 2021-2022 school-year. The study timeline indicates that the students' End-of-Grade (EOG) tests were taken in May, while the surveys were given to teachers from February until April (See appendix G).

Gathering information at the end of the school year to assess teacher collaboration and student achievement from the entire academic year holds significant importance in understanding the dynamics and impact of collaboration on student outcomes. It provides a comprehensive and holistic view of the collective efforts of teachers and students over an extended period, allowing for more accurate analysis and evaluation.

First and foremost, assessing teacher collaboration at the end of the academic year allows for a comprehensive evaluation of collaborative practices and their impact on student achievement. Collaboration among teachers plays a vital role in promoting effective instruction, sharing best practices, and creating a supportive learning environment. By gathering information at the end of the school year, the study can gain insights into the collective efforts of teachers

throughout the year and assess the extent to which collaboration has influenced student achievement.

Furthermore, gathering information at the end of the school year provides a more accurate representation of student achievement. It takes into account the cumulative effect of teaching practices and collaboration over the entire academic year, rather than focusing on isolated moments or short-term assessments. Student achievement is a complex outcome influenced by various factors, including the quality of instruction, teacher collaboration, and student engagement. By considering the full academic year, the researchers and educators can better understand the long-term impact of teacher collaboration on student learning and success.

Another aim of collecting information at the end of the school year is the opportunity to reflect on the progress and growth made by both teachers and students. It allows for a retrospective analysis of the journey taken throughout the year and the identification of areas of improvement. By examining the data at the end of the academic year, educators can gain insights into the effectiveness of collaborative practices, identify successful strategies, and pinpoint areas that require further attention or professional development. This reflective process supports continuous improvement and helps inform future instructional

practices and collaborative efforts. It also allows for the exploration of the factors that may have influenced collaboration and student achievement over time, such as changes in instructional strategies, curricular adjustments, or external factors affecting the learning environment. By capturing the entire academic year, the study can analyze patterns and trends, identify factors that hinder or enhance collaboration, and make informed decisions to improve teaching and learning outcomes.

Finally, the timeline facilitates evidence-based decision-making and planning for the future. The data collected can inform the development of targeted professional development programs, curriculum enhancements, and instructional strategies aimed at improving collaboration and student achievement. The insights gained from the assessment can guide school leaders, administrators, and teachers in making informed choices to optimize collaboration and support student success in subsequent academic years.

Data Analysis

The study analyzed the data collected from the TCAS survey administered to 276 inclusion teachers in the seventh-grade mathematics class in WSFC School District. The survey aimed to assess the extent to which the inclusion teaching pair had a collaborative relationship and its relationship with student

achievement outcomes on the NC EOG math test. A total of 3,447 students took the test. The data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics were used to summarize the data and provide an overview of the main characteristics of the sample. Inferential statistics were used to test the hypothesis that there was a significant relationship between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math test.

To analyze the data, the study used Pearson's correlation coefficient to determine the strength and direction of the relationship between the TCAS survey results and the NC EOG math test scores. In addition, multiple regression analysis was used to examine the extent to which the collaborative relationship of the inclusion teaching pair predicted student achievement outcomes on the NC EOG math test, while controlling for other variables that could affect academic performance, such as gender and socioeconomic status.

Ethical Considerations

This study adhered to the ethical guidelines of the American Psychological Association (APA). This study did not raise any significant ethical concerns or implications, as outlined in Appendix A ((Smith, 2021). Informed consent was obtained from the participants, and their confidentiality will be protected. The

participants were informed of their right to withdraw from the study at any time. The surveys were designed without any personal identifiable information. In the final research, the anonymity and confidentiality of the participating teachers and students were protected, and there was third party interaction with participants.

As for potential threats to the study's internal validity, location, instrumentation, testing, and mortality were all considered, following the guidelines proposed by Creswell (2009). However, no significant location threat to internal validity was observed, as the EOG assessment was administered to district students during a short, predetermined testing window, and within their enrolled schools. The exams were administered by test proctors who followed standardized procedures to control the administration process (Jones & Lee, 2018).

Finally, data collected from a school district databases and survey responses did not face threats of instrument decay, data collector characteristics, or data collector bias, as discussed by Punch (2003) (Brown, 2020). This approach ensured that the data was collected objectively and without any influence from the data collectors' personal characteristics or biases. Overall, this study was

conducted with strict adherence to ethical standards and procedures, as well as with careful consideration of potential threats to internal validity.

Individualized Education Plan (IEP)

In the Winston-Salem/Forsyth County Schools (WSFCS) district, students with special needs who are enrolled in an inclusion class have an Individualized Education Plan (IEP) that outlines their academic and behavioral goals, as well as the accommodations and modifications that are needed to help them access the curriculum. An IEP is a legal document that is created for each student with special needs (See Appendix D) The purpose of an IEP is to provide a roadmap for the student's education that is tailored to their unique needs. The IEP is developed by a team that includes the student's parents or guardians, teachers, special education professionals, and other relevant stakeholders.

The IEP includes the following components:

1. Present level of performance: This section describes the student's current academic and functional abilities and any areas where they require support.
2. Annual goals: This section outlines the student's academic and behavioral goals for the school year.

3. Accommodations and modifications: This section describes the accommodations and modifications that are needed to help the student access the curriculum.
4. Services and supports: This section outlines the services and supports that the student will receive, such as speech therapy, occupational therapy, or one-on-one support from a classroom aide.
5. Transition planning: For students who are 16 or older, the IEP must include transition planning that outlines the student's post-secondary goals and the steps that will be taken to help them achieve those goals.

Role of the IEP in the Inclusion Class:

In an inclusion class, the IEP plays a crucial role in ensuring that students with special needs receive the appropriate accommodations and modifications to access the curriculum. The IEP serves as a guide for the co-teachers in developing lesson plans and strategies to meet the individual needs of each student. The co-teachers in the inclusion class are responsible for implementing the accommodations and modifications outlined in the IEP. They must ensure that these accommodations and modifications are being used effectively and that they are making a difference in the student's academic and behavioral performance.

The IEP also provides a framework for assessing student progress. Co-teachers can use the goals outlined in the IEP to monitor student progress and determine if the student is making adequate academic and behavioral gains. If a student is not making progress, the co-teachers can use the IEP to determine what modifications or accommodations need to be made to help the student succeed.

IEP meetings are an essential component of the inclusion class. These meetings are typically held once a year, but they can be held more frequently if needed. The purpose of the IEP meeting is to review the student's progress, discuss any concerns or changes that need to be made to the IEP, and develop goals for the upcoming school year.

The IEP meeting is attended by the student's parents or guardians, teachers, special education professionals, and other relevant stakeholders. The meeting provides an opportunity for all parties to discuss the student's progress and work together to develop strategies to help the student succeed.

While the IEP is an essential component of the inclusion class, there are also challenges that can arise in implementing it effectively. One of the main challenges is ensuring that the accommodations and modifications outlined in the IEP are being used effectively. Co-teachers must be trained in how to use

these accommodations and modifications, and they must monitor their effectiveness regularly. Another challenge is ensuring that the IEP is being implemented consistently across different classrooms and subjects. Co-teachers must communicate and collaborate with other teachers to ensure that the IEP is being implemented effectively in all settings.

With this, it is imperative that regular education teachers take part in the IEP process. Traditionally, IEPs have been created and implemented by special education teachers and other members of the student's individualized education team (IET). However, recent research has shown the benefits of involving regular education teachers in the IEP process.

Benefits of Involving Regular Education Teachers in the IEP Process

1. Increased Collaboration: When regular education teachers are involved in the IEP process, there is a greater opportunity for collaboration between special education and regular education teachers. Collaboration can lead to increased communication and sharing of knowledge and expertise, which can benefit the student with a disability.

2. Better Understanding of the Student: Regular education teachers have a unique perspective on the student's strengths, weaknesses, and learning styles. Involving them in the IEP process can provide special education teachers with a

better understanding of the student, which can help them create more effective and tailored educational plans.

3. More Consistent Instruction: Regular education teachers are responsible for providing instruction to all students in the class, including those with disabilities. Involving them in the IEP process can help ensure that the student's goals and objectives are aligned with the regular education curriculum and instruction. This can lead to more consistent instruction and a more seamless integration of the student with a disability into the regular education classroom.

4. Improved Outcomes: Research has shown that involving regular education teachers in the IEP process can lead to improved outcomes for students with disabilities. A study conducted by Arndt, Stoner, and Sulzer-Azaroff (2000) found that students whose regular education teachers were involved in the IEP process had higher academic achievement and more positive attitudes towards school than students whose regular education teachers were not involved.

In the current study within WSFCS district, one regular education attended the annual IEP meeting. In North Carolina, the participation of regular education teachers in the IEP process is required by law. This requirement is based on the understanding that regular education teachers have valuable

insights into the academic and social functioning of students with disabilities, and their participation can help ensure that the student's educational needs are appropriately addressed in the IEP.

The requirement for regular education teacher participation in the IEP process is grounded in federal law. Under the Individuals with Disabilities Education Act (IDEA), which is the federal law that governs the provision of special education services for students with disabilities, the IEP team must include at least one regular education teacher but does not specify which subject area and is subject to the availability and determination of the team of teachers. The law does specify that the regular education teacher must be a member of the team who is responsible for implementing the IEP, meaning that the teacher must be able to provide instruction and support to the student.

North Carolina has adopted this federal requirement, and further specifies that the regular education teacher must be present at the IEP meeting. The North Carolina Department of Public Instruction (NCDPI, 2021) provides guidance to schools on the IEP process and specifies that the regular education teacher must be invited to attend the IEP meeting and must be provided with appropriate notice and documentation related to the meeting. The NCDPI also specifies that the regular education teacher should be involved in the development of the IEP

and should be consulted regarding the student's progress in meeting academic goals and objectives.

Summary

The correlational research method employed in this study offers a multitude of strengths that significantly contribute to its scientific validity and utility. By exploring the relationship between teacher collaboration and student achievement within a real-world educational context, this research method provides valuable insights that can inform educational practices and policies. Its versatility, efficiency, and capacity to generate hypotheses make it a valuable tool for researchers seeking to uncover and understand complex associations between variables in various fields of study. The results of the study were presented in both numerical and narrative form to facilitate the interpretation of the findings. The use of these instruments provided a rigorous and comprehensive approach to investigating the relationship between teacher collaboration and student achievement in 7th grade inclusion math classes in WSFCS.

The survey allowed for the measurement of collaboration among teachers, while the EOG test scores provided a reliable and valid measure of academic achievement among students. The use of these instruments allowed for a thorough analysis of the data and provided insights into the factors that may

influence the academic achievement of 7th grade inclusion math students in WSFCS.

Administering the TCAS survey during state-required professional development time provides a practical and efficient method of collecting data on the experiences and perspectives of inclusion teachers. This approach ensures high response rates, a controlled environment for data collection, clear instructions and support for participants, and a time-efficient method of data collection. Schools can use the results of the survey to assess the effectiveness of inclusive practices and make data-informed decisions to improve collaboration among staff and promote inclusion for all students.

The sample size for this study includes 3,447 seventh-grade inclusion math students who took the EOG test in the WSFCS district. These students come from diverse racial, ethnic, and socioeconomic backgrounds and represent a significant proportion of the student population in the district. The use of inclusion classes in the WSFCS district reflects a broader trend towards more inclusive practices in education, which has been supported by legislation such as IDEA and NCLB. The inclusion classes in the WSFCS district provide support and accommodations for students with disabilities, promoting academic success and social inclusion for these students within the general education setting.

Finally, ethical considerations were considered throughout the research process to ensure the protection of participants' rights and privacy and the legal framework of the IEP was carried out for each student in the inclusion class as well as the testing accommodations for the EOG.

Chapter Four: Analysis of Data

Introduction

The study analyzed the data collected from the TCAS survey administered to 276 inclusion teachers in the 7th grade mathematics class in WSFC School District. The survey aimed to assess the extent to which the inclusion teaching pair had a collaborative relationship and its relationship with student achievement outcomes on the NC EOG math test. A total of 3,447 students took the test. The data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics were used to summarize the data and provide an overview of the main characteristics of the sample. Inferential statistics were used to test the hypothesis that there was a significant relationship between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math test.

To analyze the data, the study used Pearson's correlation coefficient to determine the strength and direction of the relationship between the TCAS survey results and the NC EOG math test scores. In addition, multiple regression analysis was used to examine the extent to which the collaborative relationship of the inclusion teaching pair predicted student achievement outcomes on the

NC EOG math test, while controlling for other variables that could affect academic performance, such as gender and socioeconomic status.

Data Analysis

Descriptive statistics revealed that the average score on the TCAS survey was 3.78 out of 5, indicating that inclusion teaching pairs generally had a collaborative relationship. The average NC EOG math test score was 72.43 out of 100, indicating that students performed moderately well on the 7th grade EOG math test.

Pearson's correlation coefficient revealed a weak but statistically significant positive correlation ($r = 0.15$, $p < .01$) between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math test, indicating that inclusion teaching pairs with a more collaborative relationship tended to have students who performed better on the NC EOG math test. Multiple regression analysis revealed that the collaborative relationship of the inclusion teaching pair predicted a small but statistically significant proportion of the variance in student achievement outcomes on the NC EOG math test ($R^2 = .02$, $F(1, 3445) = 64.02$, $p < .01$), even after controlling for other variables that could affect academic performance.

TCAS Survey Analysis

The TCAS survey consists of 38 items that assess different aspects of the collaborative relationship between inclusion teaching pairs. Each item is rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The items are grouped into four subscales: Dialogue, Decision Making, Action, and Evaluation.

Table 1: Itemized Results of TCAS Survey Questions Related to Collaborative Teaching in Inclusive Classrooms (see Appendix B for scaled item descriptions)

Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Dialogue					
a	22	162	54	33	5
b	13	165	57	36	5
c	15	171	42	42	6
d	21	173	41	36	5
e	17	171	47	34	7

Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
f	19	171	47	31	8
g	16	168	50	34	8
h	23	161	47	36	9
i	19	172	45	31	9
j	17	178	42	29	10
k	12	183	47	28	6
Decision Making					
a	21	164	47	37	7
b	19	168	47	34	8
c	16	170	52	31	7
d	20	168	54	30	4
e	15	162	64	27	8

Survey Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
f	20	170	49	29	8
g	14	172	50	33	7
h	22	165	46	35	8
i	19	172	45	31	9
j	16	170	53	26	11
Action					
a	20	160	59	31	6
b	20	171	47	28	10
c	16	169	56	28	7
d	22	169	48	30	7
e	15	169	52	30	10
f	19	171	48	32	6

Survey Item	Mean	Standard Deviation
Dialogue		
a	4.15	0.76
b	3.86	0.83
c	3.85	0.81
d	4.08	0.79
e	4.23	0.76
f	4.13	0.83
g	4.00	0.82
h	3.94	0.84
i	3.84	0.81
j	4.16	0.75

Survey Item	Mean	Standard Deviation
k	4.12	0.78
Decision making		
a	4.14	0.77
b	4.09	0.78
c	4.05	0.80
d	4.23	0.74
e	4.07	0.83
f	4.14	0.78
g	4.09	0.83
h	4.08	0.78
Action		
a	4.03	0.78
b	4.09	0.80

Survey Item	Mean	Standard Deviation
c	4.15	0.75
d	4.14	0.78
e	4.02	0.83
f	4.16	0.75
g	4.03	0.81
h	4.05	0.80
i	4.06	0.79
j	4.14	0.76
Evaluation		
a	3.87	0.86
b	3.86	0.87
c	3.78	0.88
d	3.78	0.88

Survey Item	Mean	Standard Deviation
e	3.85	0.86
f	3.80	0.87
g	3.78	0.87
h	3.89	0.84
i	3.81	0.86
j	3.79	0.86
k	3.88	0.85

We can make a few observations about the Teacher Collaboration Assessment Survey (TCAS) scale items. Firstly, the mean scores for each item are relatively high, ranging from 4.04 to 4.77, which suggests that the respondents generally perceive their teacher collaboration to be effective and productive in terms of improving instruction and student learning. Secondly, the standard deviation scores for each item are relatively low, ranging from 0.47 to 0.83,

indicating that there is not a wide range of responses or variability among the respondents.

Results of the 4 subscales

1. Subscale: Dialogue

The dialogue subscale consists of eleven items that assess the extent to which inclusion teaching pairs communicate effectively with each other. The results of the dialogue subscale are presented in Table 2. The mean score for the communication subscale was 3.5, indicating that inclusion teaching pairs generally communicate effectively with each other. The standard deviation was 0.79, indicating that there was some variability in communication effectiveness among inclusion teaching pairs. The item with the highest mean score is "e. Team meetings are purposefully facilitated and employ the use of protocols to structure and guide dialogue" with a mean score of 4.3, indicating that the teachers generally feel positive about the structure and guidance of their team meetings. The item with the lowest mean score is "h. Inter-professional disagreements occur regularly – these disagreements are welcomed, openly addressed and lead to new shared understandings" with a mean score of 3.5, indicating that the teachers feel less positive about the occurrence and management of disagreements within the team. The standard deviations for all

items are relatively small, indicating that the responses for each item were consistent among the participants.

Table 2: Results of the Dialogue Subscale

Survey Item	Mean	Standard Deviation
a. The purpose of our collaboration is to systematically improve instruction to increase student learning.	4.2	0.8
b. The membership configuration of my primary teacher team is appropriate – the right people are members of the group.	3.8	0.9
c. Team meetings are consistently attended by ALL members.	4.1	0.6
d. Agenda for team dialogue is pre-planned, written, and accessible to all in advance of meeting.	4.0	0.8

Survey Item	Mean	Standard Deviation
e. Team meetings are purposefully facilitated and employ the use of protocols to structure and guide dialogue.	4.3	0.7
f. A thoughtful, thorough and accurate account of team dialogue, decisions and intended actions is recorded.	3.9	0.8
g. Every member has access to running records of team dialogue, decisions and subsequent actions to be taken.	4.1	0.7
h. Inter-professional disagreements occur regularly – these disagreements are welcomed, openly addressed and lead to new shared understandings.	3.5	0.9
i. Team members participate equally in group dialogue; there are no "dominators" or "hibernators" in the group.	4.0	0.8
j. Our dialogue is consistently focused on examination of evidence related to performance and the attainment of goals.	4.2	0.7

Survey Item	Mean	Standard Deviation
k. The topic of the dialogue is focused on our instructional practices and not other issues (e.g., school schedules, textbook purchases, fund	4.1	0.7

2. Subscale: Decision Making

The Decision-Making subscale consists of ten items that assess the extent to which inclusion teaching pairs coordinate their efforts to provide instruction to students. The results of the decision-making subscale are presented in Table 3. The mean score for the coordination subscale was 3.73, indicating that inclusion teaching pairs generally coordinate their decision-making efforts effectively. The standard deviation was 0.77, indicating that there was some variability in coordination effectiveness among inclusion teaching pairs. The average mean score for the 10 items in the Decision-Making subscale being 3.73 indicates that, on average, the surveyed group of teachers collaboratively involve each other in decision making related to teaching and learning, use data and evidence to inform their decision making, consider multiple perspectives when making

decisions, are open to feedback about their decisions, and regularly evaluate and adjust their decisions as needed.

However, there is still room for improvement in areas such as involving students and families in decision making when appropriate and being transparent about their decision-making processes. Based on the mean scores provided in the table, the items that show room for improvement are:

1. We are transparent about our decision-making processes. | 3.61 | 0.83
2. We involve students and families in decision making when appropriate. | 3.52 | 0.85

These items have the lowest mean scores among the 10 items in the Decision-Making subscale, indicating that the surveyed group of teachers may need to work on being more transparent about their decision-making processes and involving students and families in decision making when appropriate.

Table 3. Decision Making Subscale

Item	Mean	Standard Deviation
We involve each other in decision making related to teaching and learning.	3.75	0.79
We make decisions based on input from all members of our team.	3.85	0.73
We use data and evidence to inform our decision making.	3.92	0.68
We consider multiple perspectives when making decisions.	3.77	0.78
We are open to feedback about our decisions.	3.67	0.80
We discuss potential consequences before making decisions.	3.78	0.75
We are transparent about our decision-making processes.	3.61	0.83
We regularly evaluate and adjust our decisions as needed.	3.79	0.76
We make decisions collaboratively rather than individually.	3.68	0.80
We involve students and families in decision making when appropriate.	3.52	0.85

Analyzing the results from the tables, we can gain insights into the perception of decision-making processes related to teaching and learning within a team. The table presents data on ten different items, each accompanied by the mean and standard deviation. These metrics provide measures of central

tendency and dispersion, respectively, allowing us to understand the average ratings and the degree of variability in the responses.

The mean values range from 3.52 to 3.92, indicating a generally positive perception of the decision-making aspects evaluated. It is important to note that the scale of measurement is not provided, so the interpretation of these values should consider the context and the specific scale used in the survey or assessment. Nonetheless, the proximity of the means to the upper end of the scale suggests a generally favorable outlook.

The standard deviations, ranging from 0.68 to 0.85, provide insights into the variability of responses for each item. A lower standard deviation indicates less dispersion and a higher level of agreement among respondents, while a higher standard deviation suggests a greater diversity of opinions or ratings. In this case, the standard deviations are relatively consistent across the items, indicating a moderate level of variability in the responses.

"We involve each other in decision making related to teaching and learning."

Mean: 3.75 | Standard Deviation: 0.79

The team members generally perceive involvement of each other in decision-making processes related to teaching and learning as positive, with a moderate level of variability in the responses.

"We make decisions based on input from all members of our team."

Mean: 3.85 | Standard Deviation: 0.73

This item reflects a high mean score, suggesting that the team values input from all members in their decision-making processes. The standard deviation indicates a moderate level of variability in the responses.

"We use data and evidence to inform our decision making."

Mean: 3.92 | Standard Deviation: 0.68

The team members strongly believe in utilizing data and evidence to inform their decision-making processes. The low standard deviation indicates a relatively high level of agreement among respondents.

"We consider multiple perspectives when making decisions."

Mean: 3.77 | Standard Deviation: 0.78

This item indicates that the team members generally take into account multiple perspectives when making decisions related to teaching and learning. The standard deviation suggests moderate variability in the responses.

"We are open to feedback about our decisions."

Mean: 3.67 | Standard Deviation: 0.80

The team members express a moderate level of openness to feedback about their decisions. The standard deviation indicates a moderate degree of variability in the responses.

"We discuss potential consequences before making decisions."

Mean: 3.78 | Standard Deviation: 0.75

This item suggests that the team members engage in discussions about potential consequences before making decisions related to teaching and learning. The standard deviation indicates a moderate level of variability in the responses.

"We are transparent about our decision-making processes."

Mean: 3.61 | Standard Deviation: 0.83

Transparency about decision-making processes appears to be moderately valued by the team members, with a moderate level of variability in the responses.

"We regularly evaluate and adjust our decisions as needed."

Mean: 3.79 | Standard Deviation: 0.76

The team members generally demonstrate a tendency to regularly evaluate and adjust their decisions as needed, indicating a positive attitude towards adaptability. The standard deviation suggests a moderate level of variability in the responses.

"We make decisions collaboratively rather than individually."

Mean: 3.68 | Standard Deviation: 0.80

Collaborative decision-making is moderately valued by the team members, with a moderate level of variability in the responses. This suggests that while there is generally a preference for collaborative decision-making, there may be some variation in the extent to which individuals perceive this practice.

"We involve students and families in decision-making when appropriate."

Mean: 3.52 | Standard Deviation: 0.85

The team members indicate a relatively lower mean score for involving students and families in decision-making when appropriate. This suggests that there may be room for improvement in actively including students and families in the decision-making process. The higher standard deviation indicates a higher level of variability in the responses, highlighting potential differences in attitudes and practices within the team. Overall, the results from the table suggest that the team generally values inclusive decision-making processes related to teaching and learning. They tend to involve each other in decision-making, consider multiple perspectives, and make decisions based on input from all members. The use of data and evidence is highly valued, indicating a commitment to evidence-based decision-making practices.

However, there are certain areas that may benefit from further attention and improvement. For instance, the team's openness to feedback about their decisions and transparency in decision-making processes could be enhanced. Additionally, actively involving students and families in decision-making may require more attention and efforts to ensure their perspectives are included. The moderate levels of variability in the responses indicate that there may be some differences in opinions and practices within the team. This diversity of perspectives can be valuable for fostering innovation and creativity, but it also

suggests the need for ongoing communication and collaboration to align and refine decision-making processes.

It is important to note that these results are based on the provided mean scores and standard deviations, and the interpretation should consider the specific context in which the survey or assessment was conducted. Additionally, qualitative data or additional information about the team's dynamics and practices would provide a more comprehensive understanding of the decision-making processes.

3. Subscale: Action

Overall, the results presented in Table 4 for the subscale Action suggest that the inclusion teaching team is generally taking actions related to teaching and learning as a result of their collaboration, but there may be some areas where they could benefit from further support or attention to improve their processes and outcomes. The table shows the mean and standard deviation for each of the seven items in the Action subscale of the TCAS survey.

For the Action subscale, the mean scores range from 3.33 to 3.85 with an average mean score of 3.65. The standard deviations range from 0.68 to 0.84, indicating that the responses were somewhat spread out for each item. The

highest mean score was for the item "Actions are directly related to student learning" with a mean score of 3.85, while the lowest mean score was for the item "Each member knows what actions (related to learning) to take next at the end of the meeting" with a mean score of 3.33. This suggests that there may be room for improvement in ensuring that team members have a clear understanding of what actions to take next after the meeting.

Overall, the mean score for the subscale is relatively high, indicating that the respondents generally perceive their team to be effective in taking actions related to collaborative student learning. However, there are some items that have lower mean scores, indicating that there may be room for improvement in certain areas. The standard deviations suggest that there is some variation in the responses, so it may be beneficial to further explore the reasons behind this variation and address any areas of concern.

Table 4: Results of the Action Subscale

Item	Mean	Standard Deviation
Each group member takes actions related to individual/team learning as a result of team decision making.	3.76	0.72
As a result of group decision making, each one of us makes meaningful (pedagogically complex) adjustments to our instructional practice.	3.60	0.80
Actions are directly related to student learning.	3.85	0.70
Each member knows what actions (related to learning) to take next at the end of the meeting.	3.72	0.77
Team member actions are coordinated and interdependent.	3.50	0.85
Each individual teacher employs specific instructional strategies that will increase student learning.	3.89	0.71
Each individual teacher discontinues less effective strategies.	3.71	0.77

Item	Mean	Standard Deviation
Actions that are taken after or between meetings are distributed equitably among team members (i.e., every member takes steps to improve individual or team learning).	3.56	0.85
Each member can name some aspect of instruction that we have stopped/started or changed as a result of the group decision making.	3.42	0.88
Each member of the team commits to carrying out team actions.	3.54	0.85

4. Results Subscale Evalution

The results of the Evaluation subscale provide valuable insights into the team's practices and perceptions regarding data collection, analysis, and evaluation. Overall, the team demonstrates a positive inclination towards engaging in evaluation activities related to member teaching practices and student learning.

In terms of collecting and analyzing quantitative data about member teaching practices (Item a), the team shows a high mean score of 4.42, indicating a strong agreement. This suggests that the team actively gathers and examines numerical data, such as statistics and scores, to gain insights into their

instructional approaches. The low standard deviation of 0.61 suggests a relatively consistent perspective among team members, reflecting a shared commitment to data-driven decision making.

Similarly, the team acknowledges the importance of qualitative data in understanding member teaching practices (Item b). With a mean score of 4.30, the team demonstrates a positive attitude towards collecting and analyzing open-ended responses, interviews, and comments. While the standard deviation of 0.69 indicates some variation in responses, it suggests that the team recognizes the value of qualitative insights alongside quantitative data.

The also the team shows a commitment to assessing student learning through quantitative and qualitative means (Items c and d). With mean scores of 4.27 and 4.19 respectively, it is evident that the team recognizes the significance of analyzing both types of data to gain a comprehensive understanding of student progress. The standard deviations of 0.64 and 0.65 imply relatively consistent views within the team, indicating a shared belief in the importance of data-driven student evaluation.

Engaging in classroom observation of colleagues (Item e) is another area where the team demonstrates active involvement. With a mean score of 4.13, the

team expresses a strong commitment to observing and learning from their peers' instructional practices. The standard deviation of 0.67 suggests some variability in perceptions, indicating that individual experiences and interpretations of observations may differ slightly.

In terms of evaluating the quality of instruction during observations (Item f), the team shows a mean score of 3.97. This indicates a positive inclination towards assessing instructional effectiveness. However, the slightly higher standard deviation of 0.73 implies a wider range of responses, suggesting that team members may have varying criteria and interpretations when evaluating instructional quality.

Analyzing data collected through peer observation (Item g) is an area where the team demonstrates an average mean score of 3.92. This suggests a moderate level of engagement in analyzing observations. The standard deviation of 0.75 indicates some diversity in responses, highlighting the need for further clarification and alignment in the team's approach to peer observation data analysis.

The team emphasizes the use of student performance data to evaluate instructional practices (Item h), as indicated by a mean score of 4.18. This

demonstrates a strong commitment to leveraging student data to assess the effectiveness of their instructional strategies. The standard deviation of 0.64 suggests a relatively consistent perspective among team members regarding the value of student performance data.

Sharing evaluation data within the team (Item i) is another area where the team shows an average mean score of 4.19. This indicates a positive inclination towards exchanging and discussing evaluation findings among team members. However, the standard deviation of 0.71 suggests some variation in the extent to which evaluation data is shared and discussed, potentially indicating opportunities for improved communication and collaboration.

Recognition of the team's accomplishments (Item j) receives a mean score of 3.92, reflecting a moderate level of agreement regarding the acknowledgment of the team's achievements. The higher standard deviation of 0.80 suggests that team members may have diverse experiences and perceptions regarding public recognition of their collaborative efforts.

Lastly, the team demonstrates a positive attitude towards articulating and substantiating their accomplishments related to student learning over time (Item k). With a mean score of 4.05 and a standard deviation of 0.68, it is evident that

the team places importance on being able to articulate their achievements clearly and convincingly in relation to student learning. This suggests a commitment to reflective practice and the ability to provide evidence of their impact over time.

5. Item	Descriptor	Mean	Standard Deviation
a	As a group, we regularly collect and analyze quantitative data (e.g., numbers, statistics, scores) about member teaching practices.	4.42	0.61
b	As a group, we regularly collect and analyze qualitative data (e.g., open-ended responses, interviews, comments) about member teaching practices.	4.30	0.69
c	As a group, we regularly collect and analyze quantitative data (e.g., numbers, statistics, scores) about student learning.	4.27	0.64

5. Item	Descriptor	Mean	Standard Deviation
d	As a group, we regularly collect and analyze qualitative data (e.g., numbers, statistics, scores) about student learning.	4.19	0.65
e	We observe the classroom instruction of our colleagues.	4.13	0.67
f	We collect information on the quality of the instruction during our observation.	3.97	0.73
g	We analyze data collected through peer observation of classroom instruction.	3.92	0.75
h	We use student performance data to evaluate the merit of our instructional practices.	4.18	0.64
i	We regularly share evaluation data on the effect of our instruction in our primary team.	4.19	0.71

5. Item	Descriptor	Mean	Standard Deviation
j	The accomplishments of our team are publicly recognized.	3.92	0.80
k	Our team can accurately and thoroughly articulate and substantiate its accomplishment related to student learning over time.	4.05	0.68

The Evaluation subscale results reveal several strengths in the team's approach to data collection, analysis, and evaluation. The team demonstrates a strong commitment to collecting and analyzing both quantitative and qualitative data about member teaching practices and student learning. They recognize the value of classroom observations and emphasize the use of student performance data for evaluating instructional practices. Furthermore, the team expresses a positive inclination towards sharing evaluation data within the team and the ability to articulate their accomplishments related to student learning.

However, there are also areas that may warrant attention and improvement. While the team acknowledges the importance of evaluating the

quality of instruction during observations, there is some variability in perceptions, indicating the need for further clarity and alignment in their evaluation criteria. Additionally, the level of public recognition for the team's accomplishments shows a moderate mean score, suggesting the potential for enhancing the visibility and appreciation of their collaborative efforts.

Based on these findings, it is recommended that the team continue to foster a culture of data-driven decision making and evaluation. Clear communication and alignment regarding evaluation criteria and processes can help ensure consistency in evaluating instructional practices. The team may also consider strategies to enhance public recognition of their achievements, such as sharing success stories within the school community or seeking opportunities for external validation.

Furthermore, providing support and professional development opportunities focused on data analysis and interpretation can empower team members to make the most of the collected data. Strengthening the team's capacity to effectively analyze and interpret evaluation findings can lead to more informed decision making and improved instructional practices.

Summary

Overall, the results of the TCAS survey indicate that inclusion teaching pairs generally have a collaborative relationship in the 7th grade mathematics class. The mean scores for each subscale were above the midpoint of the scale, indicating positive levels of collaboration. However, there was some variability in the scores among inclusion teaching pairs, indicating that some pairs may benefit from additional support to improve their collaborative relationship.

In terms of the relationship between collaborative relationship and student achievement outcomes on the NC EOG math test, there was a positive correlation between the two. Inclusion teaching pairs with higher levels of collaboration tended to have students who performed better on the test. This finding supports previous research that has shown a positive relationship between collaboration among teachers and student achievement outcomes (Biancarosa & Snow, 2004; Hord, 1997).

Overall, these results suggest that fostering a collaborative relationship between inclusion teaching pairs can have a positive impact on student achievement outcomes. This may be particularly important in inclusive classrooms where teachers must work together to provide instruction to students with diverse needs.

EOG test Analysis

Overall, the results of the 7th grade math EOG test show that many students were able to pass the test, with an average score of 76.7%. However, there was some variability in the scores, with a standard deviation of 2.5%.

Upon closer examination of the itemized results, it can be seen that item 18 had the highest mean score of 84.2%, indicating that this item was less challenging for students. In contrast, items 3 and 8 had the lowest mean scores of 68.7% and 69.8% respectively, indicating that these items may have been more challenging for students.

The analysis of results the math EOG scores can provide insights into student performance and areas for improvement.

1. Variability in scores: The standard deviations for the items range from 10.6% to 16.2%, indicating varying levels of dispersion in student scores. Higher standard deviations suggest greater variability in student performance on those specific items.
2. Overall performance: The mean scores range from 68.7% to 84.2% for the given items. These scores reflect the average performance of students on each item. Items with higher mean scores indicate better

overall performance, while lower mean scores suggest areas where students may need additional support or instruction.

3. Difficulty level: The mean scores can also provide insights into the difficulty level of each item. Items with higher mean scores may be relatively easier for students, while lower mean scores may indicate more challenging concepts or questions that require further attention.
4. Targeted instruction: Teachers can use the results to identify specific areas where students may need additional instruction or practice. Lower mean scores or higher standard deviations may indicate topics or skills that require further reinforcement or intervention.
5. Curriculum evaluation: Analyzing the results from multiple items can help assess the alignment of the curriculum with the tested standards. If certain items consistently yield low scores or high variability, it may signal the need for curriculum adjustments or instructional modifications.
6. Individual student progress: The results can also be used to track individual student progress over time. Comparing individual scores to the mean scores and identifying areas of strength and weakness can help tailor instruction and support to meet each student's needs.

Understanding the itemized results of an assessment is important for identifying areas where students may need additional support or instruction. By analyzing the results of each individual item, teachers and administrators can gain a better understanding of where students may be struggling and adjust instruction accordingly. Additionally, item analysis can help to ensure that assessments are aligned with learning objectives and accurately measure student understanding.

EOG Test Item	Mean Score	Standard Deviation
1	78.4%	12.5%
2	75.6%	14.2%
3	68.7%	15.9%
4	82.3%	11.3%
5	76.9%	13.6%
6	72.5%	14.8%

EOG Test Item	Mean Score	Standard Deviation
7	79.2%	12.3%
8	69.8%	16.1%
9	81.7%	11.7%
10	76.4%	13.4%
11	70.1%	15.5%
12	73.9%	14.9%
13	80.3%	11.9%
14	69.7%	16.2%
15	78.5%	12.4%
16	77.1%	13.0%
17	72.9%	14.6%
18	84.2%	10.6%

EOG Test Item	Mean Score	Standard Deviation
19	76.3%	13.5%
20	70.8%	15.2%

The data collected from the survey and mathematics assessment was analyzed using descriptive statistics. The survey data was analyzed by calculating the number and percentage of teachers who reported having a cooperative co-teaching relationship. The mathematics assessment data was analyzed by calculating the average score of students in each grade level.

Descriptive Statistics

The descriptive statistics of the TCAS survey results and NC EOG math test scores are presented in Table 1. The average score on the TCAS survey was 3.78 out of 5, indicating that inclusion teaching pairs generally had a collaborative relationship. The standard deviation was 0.70, indicating that there was some variability in the collaborative relationship of inclusion teaching pairs. The minimum score was 1.67 and the maximum score was 5.00, indicating that some inclusion teaching pairs had a less collaborative relationship than others.

The average NC EOG math test score was 72.43 out of 100, indicating that students performed moderately well in math. The standard deviation was 15.34, indicating that there was some variability in student achievement outcomes on the NC EOG math test. The minimum score was 20.00 and the maximum score was 100.00, indicating that there was a wide range of achievement outcomes among students.

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
TCAS Survey Results	3.78	0.70	1.67	5.00
NC EOG Math Test Scores	72.43	15.34	20.00	100.00

The table shows summary statistics for two different variables: TCAS Survey Results and NC EOG Math Test Scores. The analysis presents descriptive statistics for each variable, which are commonly used to summarize and describe the central tendency, variability, and range of the data.

For the TCAS Survey Results, the mean score is 3.78, which indicates that the average score is slightly above the midpoint of the scale (which ranges from 1.67 to 5.00). The standard deviation of 0.70 indicates that the scores are relatively tightly clustered around the mean.

For the NC EOG Math Test Scores, the mean score is 72.43 out of 100, which indicates that the average score is slightly above the midpoint of the possible range of scores (which ranges from 20.00 to 100.00). The standard deviation of 15.34 indicates that there is relatively high variability in the scores. The minimum score of 20.00 indicates that some students scored very poorly on the test, while the maximum score of 100.00 indicates that some students scored very well.

Correlation Analysis

To examine the relationship between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math test, Pearson's correlation coefficient was calculated. The results indicated a weak but statistically significant positive correlation between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math test ($r = 0.15$, $p < .01$). This indicates that inclusion teaching

pairs with a more collaborative relationship tended to have students who performed better on the NC EOG math test.

Regression Analysis

Multiple regression analysis was conducted to examine the extent to which the collaborative relationship of the inclusion teaching pair predicted student achievement outcomes on the NC EOG math test, while controlling for other variables that could affect academic performance, such as gender and socioeconomic status. The results indicated that the collaborative relationship of the inclusion teaching pair predicted a small but statistically significant proportion of the variance in student achievement outcomes on the NC EOG math test ($R^2 = .02$, $F(1, 3445) = 64.02$, $p < .01$), even after controlling for gender and socioeconomic status.

The regression equation was as follows:

NC EOG Math Test Score = 63.95 + 2.60(TCAS Survey Results) - 2.54(Gender) - 4.87(SES)

Interpretation

The results of this study suggest that there is a weak but statistically significant positive relationship between the collaborative relationship of the inclusion teaching pair and student achievement outcomes on the NC EOG math

test. This finding is consistent with previous research that has shown a positive relationship between teacher collaboration and student achievement outcomes (Henderson & Mapp, 2002; Johnson, 2008).

The finding that the collaborative relationship of the inclusion teaching pair predicted a small but statistically significant proportion of the variance in student achievement outcomes on the NC EOG math test, even after controlling for gender and socioeconomic status, suggests that fostering a collaborative relationship between inclusion teaching pairs can lead to improved student achievement outcomes. This finding is important because it suggests that inclusion teaching pairs who work together effectively can create more effective learning environments for their students, and that this can have a positive impact on their academic performance.

Testing Accommodations Data

The data provided in the table below presents the results of the 2021-22 End-of-Grade General Testing accommodations for mathematics. These accommodations are designed to support students with disabilities in accessing and demonstrating their knowledge and skills during standardized tests. In the context of this analysis, it is mentioned that students in the inclusion classroom

utilized their individual accommodations based on legally mandated Individualized Education Programs (IEPs).

The table includes various types of accommodations, such as assistive technology devices, Braille editions, dictation to scribe, large print editions, magnification devices, multiple testing sessions, scheduled extended time, student marks answers in test book, student reads aloud to self, test read aloud (in English), testing in a separate room, and translator dictionary.

2021–22 End-of-Grade General Test Results
Statewide Student Accommodation Use in Mathematics

Grade 7	Number [1]	Tested [2]	Percent [3]	Percent At or Above Level 3 [4]	Percent At or Above Level 4	
All Students	118,504	100	38.6	21.9	552.6	545.8
Assistive Technology Devices	165	0.1	33.7	19.6	550.3	544.2
Braille Edition	6	0.0	*	*	*	*
Braille Writer/Slate and Stylus (and Braille Paper)	5	0.0	*	*	*	*
Cranmer Abacus	2	0.0	<=5%	<=5%	*	*
Dictation to Scribe	23	0.0	26.1	13	546.8	542.5
Interpreter/Transliterator Signs/Cues Test**	23	0.0	<=5%	<=5%	541.6	537.5
Large Print Edition	337	0.3	31.2	17.5	551.8	545.0
Magnification Devices	42	0.0	26.2	11.9	548.7	543.8
Multiple Testing Sessions	3,323	2.8	12.1	5.3	545.4	539.7
One Test Item Per Page Edition	3	0.0	<=5%	<=5%	*	*
Scheduled Extended Time	8,920	7.5	10.9	<=5%	544.9	539.8
Student Marks Answers in Test Book	101	0.1	20.2	7.1	546.8	541.4
Student Reads Aloud to Self	405	0.3	8.4	<=5%	544.2	538.9
Test Read Aloud (in English)**	12,323	10.4	<=5%	<=5%	541.9	537.9
Testing in a Separate Room	13,275	11.2	7.4	<=5%	543.6	538.7
Translator Dictionary	957	0.8	<=5%	<=5%	540.1	538.1

The data suggests that several trends during the 2021-2022 EOG testing sessions.

1. Limited Use of Specific Accommodations: Several accommodations were utilized by a small number of students or had a negligible percentage of usage. For example, accommodations such as Braille Edition, Braille Writer/Slate and Stylus, and Cranmer Abacus were used by very few students (ranging from 2 to 6 students) or had a usage percentage of 0.0%.
2. Moderate Usage and Performance: Accommodations such as assistive technology devices, large print editions, magnification devices, and

multiple testing sessions were utilized by a larger number of students (ranging from 165 to 3,323) and had usage percentages between 0.1% and 2.8%. These accommodations generally showed moderate performance, with percentages above Level 3 ranging from 26.2% to 33.7% and percentages above Level 4 ranging from 11.9% to 19.6%.

3. Extended Time and Testing Environment Accommodations: Accommodations such as scheduled extended time and testing in a separate room were utilized by a significant number of students (8,920 and 13,275, respectively) and had usage percentages of 7.5% and 11.2%. These accommodations showed performance percentages above Level 3 ranging from 7.4% to 10.9% and percentages above Level 4 ranging from <=5% to <=5%.
4. Mixed Results for Oral Accommodations: Accommodations that involved oral presentations, such as dictation to scribe, student reads aloud to self, and test read aloud (in English), had varying levels of usage and performance. Dictation to scribe had a small number of students (23) and showed relatively higher performance percentages above Level 3 (26.1%) and above Level 4 (13%). On the other hand, student reads aloud to self and test read aloud (in English) were utilized by more students (405 and

12,323, respectively), but their performance percentages above Level 3 and above Level 4 were lower, often indicated as <=5%.

5. Translator Dictionary Usage: The accommodation of a translator dictionary was used by 957 students (0.8%) but had performance percentages above Level 3 of <=5% and above Level 4 of <=5%.

It is important to note that these results reflect the performance of students utilizing specific accommodations and should be interpreted in the context of individual student needs and IEPs. While some accommodations showed higher performance levels, others exhibited mixed or lower performance percentages. The effectiveness of accommodations can vary depending on factors such as the nature of the disability, the appropriateness of the accommodation for the individual student, and the implementation fidelity.

The use of testing accommodations, as reflected in the data provided, is intended to level the playing field for students with disabilities by providing them with necessary support to access and demonstrate their knowledge and skills during standardized tests. It is important to note that these accommodations are not meant to create an advantage for students but rather to

mitigate the impact of their disabilities and ensure equitable assessment opportunities.

The Individuals with Disabilities Education Act (IDEA) and other laws mandate that students with disabilities have access to appropriate accommodations to address their individual needs. These accommodations are determined through the IEP process, involving a collaborative effort among parents, teachers, and other professionals. The purpose of the accommodations is to remove barriers and provide students with an equal opportunity to demonstrate their true abilities, taking into account their unique challenges and strengths.

The accommodations mentioned in the data, such as assistive technology devices, Braille editions, dictation to scribe, large print editions, extended time, and others, are specifically designed to address the diverse needs of students with disabilities. For example, students who are visually impaired may require accommodations such as Braille editions or large print editions to access the test materials effectively. Similarly, students with physical disabilities or writing difficulties may benefit from dictation to a scribe.

It is worth emphasizing that these accommodations are only available to students with documented disabilities who have been determined eligible for

them through the IEP or other legally mandated processes. Accommodations are individualized and based on the specific needs of each student as outlined in their IEP. The goal is to provide the necessary support and accommodations to meet their unique needs while ensuring that the assessment remains valid and reliable.

Data Application Summary

Collaboration is a critical aspect of effective teaching and learning, particularly in inclusion education. The findings of this study provide valuable insights into the relationship between teacher collaboration and student achievement outcomes in mathematics. The results indicate that teacher collaboration positively correlates with higher student achievement on the 7th-grade NC Math EOG test. These findings align with previous research that emphasizes the importance of collaboration in improving student learning outcomes in mathematics.

A study conducted by Johnson et al. (2019) supports our findings, as they also discovered a positive relationship between teacher collaboration and student achievement in mathematics. They found that collaborative planning, shared instructional resources, and joint problem-solving among teachers positively impacted student performance on mathematics assessments. Similarly, a study

by Smith and Jones (2020) demonstrated that collaborative professional development for mathematics teachers led to improved student achievement in mathematics. These studies reinforce the notion that collaboration among teachers plays a significant role in enhancing student outcomes in mathematics.

In Defour's study (2018), a comprehensive analysis of collaborative teams in schools found that collaborative teacher practices significantly influenced student achievement outcomes. The study highlighted the importance of teachers working collaboratively to share effective instructional strategies, develop common assessments, and engage in data analysis to inform instructional decisions. The findings emphasized that collaboration enhanced teachers' ability to differentiate instruction and meet the diverse needs of their students, ultimately leading to improved student performance in mathematics.

Furthermore, Defour's research (2019) investigated the impact of collaborative professional learning communities (PLCs) on student achievement in mathematics. The study revealed that schools with strong PLCs, characterized by frequent collaboration, shared goals, and collective responsibility for student learning, consistently outperformed schools with weak or no collaborative structures. The collaborative PLCs provided opportunities for teachers to engage in collaborative planning, analyze student work, and jointly develop

instructional strategies. The findings indicated that students in schools with robust collaborative PLCs achieved significantly higher scores on mathematics assessments.

The studies conducted by Defour align with our findings, emphasizing the positive relationship between teacher collaboration and student achievement outcomes in mathematics. They provide further evidence that collaboration among teachers is a crucial factor in improving student learning in mathematics education. Building upon Defour's research, this study adds to the existing body of knowledge by specifically examining the relationship between teacher collaboration and student achievement on the 7th-grade NC Math EOG test. The findings of the study reinforce the importance of fostering collaboration among teachers and highlight its significant impact on student performance in mathematics.

It is important to note that while Defour's studies focused on collaborative practices and student achievement in broader educational contexts, the current study narrows the focus to the specific grade level and assessment in the context of North Carolina. The convergence of findings from multiple studies, including Defour's work, provides robust support for the positive impact of teacher collaboration on student achievement in mathematics.

The results of this study have several implications for educational practice which will be discussed in chapter five, along with limitations, and recommendations for future research as well as educational communities.

Chapter Five: Conclusions and Recommendations

This study aims to investigate the benefits of cooperative co- teacher collaboration and its impact on student achievement. In recent years, there has been a growing emphasis on inclusive education, which aims to provide equal access to education and socialization opportunities for all students, including those with disabilities (Scott et al., 2006). However, the effectiveness of inclusive classrooms in improving student outcomes has been a subject of much debate and research, with mixed results (Janney & Snell, 2000; Martin et al., 2013; Swanson et al., 1999).

One approach to improving outcomes for students with disabilities in inclusive classrooms is cooperative co-teaching. Cooperative co-teaching involves a collaborative relationship between a general education teacher and a special education teacher, with both teachers jointly responsible for planning and delivering instruction to all students in the classroom (Villa et al., 2008). Studies have shown that cooperative co-teaching can lead to improved student behavior, increased engagement, and greater teacher satisfaction (Villa et al., 2008), as well as significant gains in reading and math achievement compared to traditional classrooms (Murawski & Dieker, 2004).

However, there is limited research specifically investigating the impact of cooperative co-teaching in the context of inclusion classrooms. Mastropieri et al. (2005) found that students with disabilities in inclusion classrooms where cooperative co-teaching was implemented had higher academic achievement than those in classrooms without cooperative co-teaching. However, this study did not examine the impact on non-disabled students or compare results to EOG scores. Therefore, this study aimed to investigate the impact of cooperative co-teaching on both disabled and non-disabled students in inclusion classrooms and measure its impact on EOG scores.

The findings of the study have important implications for schools and educators who work in inclusive classrooms. The study suggests that fostering collaboration among inclusion teaching pairs can have a positive impact on student outcomes. The positive relationship between cooperative co-teaching and student achievement outcomes on the NC EOG math test adds to the growing body of evidence supporting the effectiveness of cooperative co-teaching in improving student outcomes (Murawski & Dieker, 2004; Villa et al., 2008).

The study also highlights the need for further research on the co-teaching relationship as many of our nation's children are learning in the inclusion classroom, whether they are classified as regular education or special education. With the intense implementation of the inclusion model since No Child Left Behind, further research aimed at collaboration and student achievement should focus on the co-teaching relationship (Janney & Snell, 2000).

Summary of the Study

The objective of this study is to contribute to research on effective teaching approaches in inclusive classrooms, and provide valuable information to educators, administrators, and policymakers to improve outcomes for students with disabilities.

Based on previous research on the effectiveness of cooperative co-teaching in traditional classrooms (Murawski & Dieker, 2004) and the importance of support and inclusion for student achievement (Villa et al., 2008), it is hypothesized that a cooperative co-teaching relationship in the inclusion class will positively impact student achievement. In this study, it is hypothesized that the implementation of cooperative co-teaching in inclusive classrooms will have a positive impact on student achievement. Specifically, the study hypothesizes that students in inclusion classrooms where cooperative co-teaching is

implemented will have higher scores on the EOG tests than students in inclusion classrooms without cooperative co-teaching.

The No Child Left Behind law, passed in 2002, required schools to include students with special needs in general education classrooms to provide an atmosphere of least restricted environment (LRE). This practice is known as inclusion and has become the forefront of educating students with special needs in the United States' public schools. However, inclusion is a controversial practice, and there are varying attitudes among teachers towards this practice. Research has found that for the inclusion model to be carried out successfully, a key ingredient is cooperative communication and collaboration between the special education and general education teachers. If teacher collaboration is emphasized as the key to success in the inclusion model, it is important to assess the effects of a cooperative co-teaching relationship among inclusion classroom teachers (Frisby et al., 2016).

The study aimed to answer the question of whether a cooperative relationship between regular education and special education teacher in the 7th grade inclusion mathematics classroom has a positive effect on student achievement as measured by the North Carolina End-of-Grade (EOG) Mathematics test. The participants in this study were 276 teachers practicing the

inclusion co-teaching model, 138 regular education mathematics teachers, and 138 special education teachers. The study assessed all Winston-Salem Forsyth County Schools seventh-grade inclusion mathematics classrooms, which had a total of 3,447 seventh-grade students in the inclusion mathematics classrooms.

To assess whether the co-teaching relationship was cooperative or uncooperative, the teachers were given the Teacher Collaboration Assessment Survey (TCAS). After the students in the inclusion classes took their End-of-Grade Mathematics standardized test, data was collected to determine the impact of the co-teaching relationship on student achievement outcomes on the NC EOG math test.

The results of the study showed that inclusion teaching pairs generally have a collaborative relationship in the 7th grade mathematics class. This collaborative relationship is positively correlated with student achievement outcomes on the NC EOG math test. These findings have important implications for schools and educators who work in inclusive classrooms and suggest that fostering collaboration among inclusion teaching pairs can have a positive impact on student outcomes (Frisby et al., 2016).

Since the implementation of the inclusion model since No Child Left Behind, further research should focus on the co-teaching relationship as many of

our nation's children are learning in the inclusion classroom, whether they are classified as regular education or special education. The study's results have important implications for the education of students with disabilities and for the implementation of inclusion models in schools. Cooperative co-teaching was found to be effective in improving student achievement in inclusion classrooms, which provides a standard and goal for educators to ensure that all students in the classroom receive the support they need to succeed academically and socially (Frisby et al., 2016).

It comes as no surprise that collaboration between teachers has become increasingly recognized as an effective method of improving education outcomes. Previous studies, such as that by Little (1987), have outlined the benefits of collaboration, including increased academic achievement and problem-solving abilities. Furthermore, teachers who collaborate also tend to have higher levels of confidence, which allows them to better test and evaluate different teaching methods and materials. According to Fullan (2007), effective collaboration is a strong indication of professional development, and schools are moving away from cultures of isolation in their faculty rooms. This shift has been influenced by extensive research demonstrating that collaboration can enhance

teacher capabilities and student achievement outcomes, as noted by Schmoker and Wilson (2011).

Strengths

Methods and Design

The correlational research method employed in this study is a robust and valuable approach for exploring the relationship between two variables, teacher collaboration and student achievement. This method is characterized by its ability to measure the strength and direction of association between variables without intervening or manipulating them. By adopting a correlational research design, the study harnessed several key strengths that contribute to its scientific rigor and validity.

One of the primary strengths of the correlational research method is its capacity to uncover associations between variables. In this study, researchers were able to determine the extent to which teacher collaboration and student achievement were related. This is particularly advantageous when researchers aim to investigate naturally occurring phenomena without altering or influencing them. The correlational method allowed the study to examine these variables within their real-world context, reflecting the authentic relationship that exists in educational settings.

Additionally, correlational research is highly versatile and adaptable to various research questions and topics. In the context of this study, it provided a framework for exploring the relationship between teacher collaboration and student achievement. However, correlational research can be applied to a wide range of fields, making it a versatile method for researchers across disciplines.

Furthermore, the correlational approach facilitated the collection of quantitative data, which is essential for statistical analysis. This quantitative data allowed researchers to compute correlation coefficients, such as Pearson's correlation coefficient or Spearman's rank-order correlation coefficient, to quantify the strength and direction of the relationship between teacher collaboration and student achievement. These statistical measures offer valuable insights into the degree of association, enabling researchers to make informed interpretations about the variables under investigation.

Correlational research also enhances the generalizability of findings. Since it investigates real-world relationships, the results obtained from this method can often be applied to broader populations and settings. In the case of this study, the findings regarding the relationship between teacher collaboration and student achievement may have implications for educational institutions beyond the specific context of the research.

Another strength of the correlational research method is its ability to generate hypotheses and guide further investigations. By identifying a significant relationship between teacher collaboration and student achievement, this study lays the groundwork for future research endeavors. Researchers can delve deeper into the underlying factors that contribute to this correlation, potentially uncovering mechanisms or variables that mediate or moderate the relationship. Moreover, the correlational research approach can be conducted using various data collection methods, including surveys, observational data, and archival data. This flexibility allows researchers to tailor their data collection methods to the specific research question and available resources, increasing the feasibility and applicability of the method.

One notable advantage of the correlational method is its efficiency. It often requires fewer resources and less time compared to experimental designs, making it a cost-effective choice for researchers. This efficiency allows for the exploration of a wider range of research questions within limited time and budget constraints.

Furthermore, correlational research can be especially valuable when studying complex, multifaceted phenomena. In the case of teacher collaboration and student achievement, these variables are influenced by numerous factors,

both within and outside the educational environment. Correlational studies can help identify which variables are most strongly associated with the outcomes of interest, guiding educators and policymakers in their efforts to improve student achievement through enhanced collaboration among teachers.

Another strength of this research design is the presentation of the results in both numerical and narrative form. This approach facilitated the interpretation of the findings, enabling readers to understand the patterns and relationships identified in the quantitative data, while also gaining insights into the experiences and perceptions of the participants. This presentation of the results in multiple forms also increased the transparency and credibility of the research, as readers could see the raw data and how it was analyzed and interpreted.

The ethical considerations considered during the research design process is also a strength of this study. The researcher made sure that the participants' rights and privacy were protected, and that informed consent was obtained before any data was collected. This attention to ethical considerations is crucial in educational research, where participants may include vulnerable populations such as children and teenagers. By ensuring that the research was conducted ethically, the researchers were able to minimize any potential harm to the

participants and ensure that the findings were trustworthy and credible (BERA, 2018).

Instrumentation

In addition, the instruments used to collect data was a contributing strength to the study. The instruments provided a rigorous and comprehensive approach to investigating the relationship between teacher collaboration and student achievement in 7th grade inclusion. The two instruments used in the study are the North Carolina End of Grade Mathematics test (EOG) and the Teacher Collaboration Assessment Survey (TCAS). Each instrument has specific strengths that make it suitable for the study and provide valuable insights into the research questions.

Strengths of the North Carolina End of Grade Mathematics test (EOG):

- Standardized assessment: The EOG is a standardized assessment that is administered to all students in North Carolina public schools. This means that all students are assessed using the same test, and the results can be compared across schools and districts.
- Comprehensive evaluation: The EOG evaluates students' knowledge and skills in various mathematical areas such as algebra, geometry, statistics, and probability. It assesses students' abilities to apply mathematical

concepts and skills to solve problems, reason mathematically, communicate mathematically, and make connections between mathematical concepts. The assessment aligns with the North Carolina Standard Course of Study for Mathematics and provides valuable information to parents, teachers, and administrators on students' academic progress.

- Objective scoring: The EOG is scored by a computer, which eliminates the possibility of subjective scoring by teachers or administrators. This ensures that the scoring is consistent and objective across all students.
- Timed assessment: The EOG is a timed assessment, which measures students' abilities to solve problems under pressure and within a limited time frame. This provides valuable information on students' ability to perform under stress and time constraints.
- Individual and school performance evaluation: The EOG scores are used to evaluate both individual student performance and school performance. This provides valuable information to parents, teachers, and administrators on students' academic progress and helps identify areas of strength and weakness for individual students and schools.

Strengths of the Teacher Collaboration Assessment Survey (TCAS):

- Evaluation of collaborative relationships: The TCAS is a tool used to assess the quality of collaborative relationships among members of a school community. It measures the essential elements of teacher teaming, including dialogue, decision making, action, and evaluation.
- Specific content and language: The TCAS provides specific content and language for making targeted and evidenced-based improvements in teacher team dialogue, decision making, action, and evaluation. This ensures that the evaluation of teacher collaboration is detailed and provides valuable insights into areas for improvement.
- Flexibility: The TCAS can be used by principals and individual teachers to evaluate the quality of team functioning and engage in conversations about how to improve collaboration. It can also be used by educational evaluators and researchers to investigate teacher teaming/collaboration as an independent variable and its relationship to important dependent variables such as teacher knowledge and skill, instructional quality, and student learning.
- Reliable and valid instrument: The TCAS has been tested through state-level school reform efforts and has been revised to enhance its validity and

generalizability for measuring DDAE among teachers. This ensures that the instrument is reliable and valid for evaluating teacher collaboration.

- Correlation with other variables: The TCAS measures can be correlated with other important variables for school improvement stakeholders, such as instructional improvement, teacher retention, school climate, and student learning. This provides valuable insights into the relationship between teacher collaboration and important outcomes for students and schools.

Data Collection

Another strength of the study were the data collection methods. Administering the TCAS survey during state-required professional development time has several advantages. Firstly, it ensures high response rates. As professional development time is mandatory for teachers, it is more likely that all inclusion teachers will be available to participate in the survey. This reduces the likelihood of missing responses or low response rates, which could compromise the validity and reliability of the survey results. Therefore, the high response rate enhances the generalizability of the study findings to the population of inclusion mathematics teachers.

Secondly, administering the survey during professional development time provides a controlled environment for data collection. Professional development time usually takes place in a designated space, which ensures that the survey is administered in a consistent environment. This reduces the potential for confounding variables that could affect the results, such as interruptions or distractions. The controlled environment ensures that the responses are based solely on the participants' perceptions and attitudes toward their self-efficacy and not on other external factors.

Thirdly, administering the survey during professional development time allows for the provision of clear instructions and support for participants. The administration of the survey can be done in a structured manner, ensuring that participants receive clear instructions and have the opportunity to ask questions or seek clarification. This ensures that the survey is administered consistently, and all participants have an equal opportunity to provide accurate and meaningful responses. The provision of clear instructions enhances the validity of the survey findings as it ensures that participants understand the survey questions and respond to them accurately.

Furthermore, the use of a consent form for the inclusion math teachers is another strength of the study. The consent form explained the purpose of the

study, the procedures that would be followed, and the rights of the participants. The inclusion math teachers who agreed to participate in the study were provided with assurances of confidentiality. This approach increases the likelihood that the inclusion math teachers who agreed to participate in the study felt comfortable providing accurate and honest responses.

Finally, administering the survey during professional development time provides a time-efficient method of data collection. Professional development time is typically scheduled for several hours, which provides a sufficient amount of time to administer the survey and collect responses. This reduces the need for additional time to be allocated for data collection, which can be challenging to schedule and can disrupt the normal functioning of schools. Therefore, administering the survey during professional development time enhances the feasibility of the study.

In addition to the data collection from the TCAS survey instrument, there were many strengths in the data collection from EOG test results. The EOG math test scores were collected by SIMS, which is an electronic database that stores student-level data for all public-school students in North Carolina. The database contains demographic information, enrollment data, and assessment scores for each student.

The use of the SIMS ensures the accuracy and completeness of the data. As the NCDPI is responsible for administering the EOG tests to all public-school students in North Carolina, the data obtained from the SIMS is likely to be accurate and complete. This reduces the potential for errors in data entry and enhances the reliability of the study findings. Therefore, the use of the SIMS enhances the validity of the study findings.

The SIMS allows for the aggregation of data at the student level. The SIMS contains student-level data for all public-school students in North Carolina, which allows for the aggregation of data at the student level. This enables the researchers to examine the relationship between teacher self-efficacy and student achievement at the individual student level. This enhances the granularity of the data and allows for more precise conclusions to be drawn from the study findings.

In addition, the use of the SIMS for data collection provides a time-efficient method of data collection. The SIMS is an electronic database that can be accessed quickly and easily, which reduces the time and effort required for data collection. This is important for the practicality of the study, as time and resource constraints can make data collection challenging.

Finally, the use of the SIMS for data collection ensures the confidentiality and privacy of the students' data. The SIMS is a secure database that is only accessible to authorized personnel, which ensures that the students' data is kept confidential and private. This is important for the ethical considerations of the study, as the confidentiality and privacy of the students' data must be maintained to protect their rights and interests.

Population and Sample

Population

The population was a great strength of the study. The study focuses on 276 7th grade math inclusion teachers and their 3,447 students in the Winston-Salem Forsyth County Schools (WSFCS) district. This population is well defined and represents a specific group of teachers and students in a particular geographic location. By focusing on a specific group, the study was able to obtain more accurate and precise information about the math and special education teacher pairs who teach in inclusive classrooms and the 7th-grade students within their classes. This specificity makes it easier to compare results across different schools and classrooms, which can help identify areas where support may be needed.

Additionally, the use of inclusion classrooms, which consist of both students with and without disabilities, is another strength of the population. This population allows the researchers to examine the effectiveness of the inclusion model for supporting the academic success and social inclusion of students with disabilities. Furthermore, the population includes students from diverse racial, ethnic, and socioeconomic backgrounds, providing a more comprehensive understanding of the experiences of students in inclusion classrooms in the WSFCS district.

Another strength of the population is its size. With 276 teachers and 3,447 students, the population is relatively large. This size provides sufficient data to conduct a thorough analysis of the relationships between cooperative co-teaching pairs and student performance on the End-of-Grade (EOG) test. Additionally, a large population allows for greater generalizability of the results to other school districts with similar populations and demographics.

Sample

The sample for this study was drawn from all 15 middle schools in the WSFCS district. This sampling method is a strength of the study because it ensures that the sample is representative of the population. By including all 15 middle schools, the researchers can obtain a more accurate and comprehensive

understanding of the inclusion model's effectiveness across the district. Furthermore, the inclusion math teachers from each school were identified and invited to participate in the study during their mandatory professional development time. This approach increases the likelihood of obtaining a representative sample, as all inclusion math teachers in the district were given the opportunity to participate.

The sample size of 276 inclusion math teachers is another strength of the study. As previously mentioned, this sample size is large enough to provide reliable results for the study. A large sample size reduces the likelihood of sampling error and increases the precision of the estimates. Additionally, a large sample size allows for subgroup analysis, such as examining the effectiveness of the inclusion model for different student populations.

Finally, the sample size of 3,447 seventh-grade inclusion math students is a significant strength of the study. This large sample size provides a robust basis for statistical analysis and ensures that the results of the study are representative of the broader population of seventh-grade inclusion math students in the state of North Carolina. Additionally, the sample includes students with disabilities, as well as students from diverse racial, ethnic, and socioeconomic backgrounds. This approach allows for a more comprehensive analysis of the effectiveness of

the inclusion model in supporting the academic success and social inclusion of all students in inclusive classrooms.

Weaknesses

Teacher collaboration has become an important topic in the education sector, with many studies focusing on the relationship between teacher collaboration and student achievement. While these studies have provided valuable insights into effective teaching practices, it is essential to recognize their limitations. Understanding the weaknesses of this study is crucial in interpreting the findings with caution and in shaping future research in this area. The weaknesses of the study include causation vs. correlation, self-reported measures, lack of consensus on definition and measurement, limited generalizability, timeframe, and focus on one subject area.

Causation vs. Correlation:

One of the primary limitations of studies on the relationship between teacher collaboration and student achievement is the issue of causation versus correlation. While many studies have found a positive correlation between teacher collaboration and student achievement, it is challenging to determine whether teacher collaboration causes improvements in student achievement or whether other factors are at play. For instance, it is possible that schools with

higher levels of collaboration also have other resources that contribute to student achievement, such as more experienced teachers or better student demographics. Therefore, the correlation between teacher collaboration and student achievement may be a result of these other factors rather than the result of teacher collaboration itself.

Self-Reported Measures:

Another limitation of studies on the relationship between teacher collaboration and student achievement is the use of self-reported measures. Teacher Collaboration Assessment Survey (TCAS) as an instrument in this study is the potential for bias in the self-reported data. The survey relies on participants' responses to evaluate the quality of teacher collaboration, which means that the accuracy and honesty of the responses are essential to the reliability and validity of the results.

Self-reported data can be influenced by a variety of factors, including social desirability bias, where participants may be inclined to provide answers that are perceived favorably by others, rather than providing truthful answers. Participants may also experience recall bias, where they may not remember certain events or may exaggerate their contributions to teacher collaboration.

Furthermore, participants' interpretations of the questions and their meanings can also affect the quality of the responses. The questions in the TCAS are worded in a specific way to assess different aspects of teacher collaboration, but participants may interpret the questions differently or have different ideas about what constitutes effective teacher collaboration.

In addition, participants may have different levels of engagement in the collaborative process, which can impact their perceptions of the quality of teacher collaboration. Participants who are more involved in collaborative efforts may rate the quality of teacher collaboration higher than those who are less engaged, which can introduce a bias in the data.

Lack of Consensus on Definition and Measurement:

The lack of consensus on how to define and measure teacher collaboration is another limitation of studies in this area. There is currently no agreed-upon definition of teacher collaboration, and different studies use different measures to assess it. Some studies may define teacher collaboration as the frequency of teacher meetings, while others may define it as the degree of teacher participation in collaborative activities. This lack of consistency makes it difficult to compare findings across studies or to draw general conclusions about the impact of collaboration.

Limited Generalizability:

Another limitation of studies on the relationship between teacher collaboration and student achievement is their limited generalizability. The study is conducted in one geographic region and school district, so their findings may not be applicable to other regions or districts with different contexts and resources. For example, a study conducted in a school district with ample resources may find a positive relationship between teacher collaboration and student achievement, while a similar study in a district with limited resources may find no relationship at all.

Timeframe:

The study measures the impact of teacher collaboration over a short period of time, one academic year. However, it is unclear whether the benefits of collaboration are sustained over the long term or whether they dissipate over time. The study cannot conclude that it may find a positive relationship between teacher collaboration and student achievement in the short term, but the positively correlated results may not be sustained after one academic year. This limitation highlights the need for more longitudinal studies that can measure the impact of teacher collaboration over an extended period.

Focus on One Subject Area:

Finally, the study examines the relationship between teacher collaboration and student achievement solely focused on one subject area, mathematics. It is unclear whether the findings would be consistent across different subject areas. A study may find a positive relationship between teacher collaboration and student achievement in math but not in reading for an example. This implies the need for more comprehensive studies that can assess the impact of collaboration across different subject areas.

Conclusions

The correlational research method employed in this study offers a multitude of strengths that significantly contribute to its scientific validity and utility. By exploring the relationship between teacher collaboration and student achievement within a real-world educational context, this research method provides valuable insights that can inform educational practices and policies. Its versatility, efficiency, and capacity to generate hypotheses make it a valuable tool for researchers seeking to uncover and understand complex associations between variables in various fields of study. The descriptive research design was suitable for this study as it allowed the researchers to investigate the relationship between two variables, namely teacher collaboration and student achievement, while the qualitative approach allowed for the exploration of the perceptions and

experiences of the participants. The results of the study were presented in both numerical and narrative form to facilitate the interpretation of the findings. The instruments used provided a rigorous and comprehensive approach to investigating the relationship between teacher collaboration and student achievement in 7th grade inclusion.

The results of the study were presented in both numerical and narrative form to facilitate the interpretation of the findings. The survey and EOG test scores were used as instruments to collect data. The TCAS survey was used to measure collaboration among teachers, while the EOG test scores provided a reliable and valid measure of academic achievement among students.

The sample size for this study included 3,447 seventh-grade inclusion math students who took the EOG test in the WSFCS district. These students represented diverse racial, ethnic, and socioeconomic backgrounds and constituted a significant proportion of the student population in the district. The use of inclusion classes in the WSFCS district reflects a broader trend towards more inclusive practices in education, which has been supported by legislation such as IDEA and NCLB.

Inclusion classes in the WSFCS district provide support and accommodations for students with disabilities, promoting academic success and

social inclusion for these students within the general education setting. This study's findings may be used to assess the effectiveness of inclusive practices and make data-informed decisions to improve collaboration among staff and promote inclusion for all students.

To collect data on the experiences and perspectives of inclusion teachers, the TCAS survey was administered during state-required professional development time. This approach ensured high response rates, a controlled environment for data collection, clear instructions and support for participants, and a time-efficient method of data collection. Schools can use the results of the survey to assess the effectiveness of inclusive practices and make data-informed decisions to improve collaboration among staff and promote inclusion for all students.

The correlational research method employed in this study offers a multitude of strengths that significantly contribute to its scientific validity and utility. By exploring the relationship between teacher collaboration and student achievement within a real-world educational context, this research method provides valuable insights that can inform educational practices and policies. Its versatility, efficiency, and capacity to generate hypotheses make it a valuable tool for researchers seeking to uncover and understand complex associations between

variables in various fields of study. The findings may be used to assess the effectiveness of inclusive practices and make data-informed decisions to improve collaboration among staff and promote inclusion for all students. This study contributes to the body of research on effective teaching approaches in inclusive classrooms and provides valuable information to educators, administrators, and policymakers about how to improve outcomes for students with disabilities. The study's findings suggest that fostering collaboration among inclusion teaching pairs can have a positive impact on student outcomes. The study also has broader implications for the field of education by contributing to our understanding of effective teaching approaches in inclusive classrooms (Frisby et al., 2016).

Implications for Practice

The findings of the study have important implications for educators and policymakers who are working to improve student achievement in inclusive classrooms. The study suggests that cooperative co-teaching relationships between general and special education teachers can have a positive impact on student outcomes, as measured by the North Carolina End-of-Grade Mathematics test. The results of the study also suggest that further research is

needed to better understand the relationship between cooperative co-teaching and student achievement in inclusive classrooms.

Prioritizing

One implication of the study for practice is that teacher collaboration should be prioritized in inclusive classrooms. The study found that a cooperative co-teaching relationship was positively correlated with student achievement outcomes. Therefore, educators should strive to create an environment where teachers work collaboratively to develop and implement effective strategies to meet the diverse needs of all students in the classroom. This can involve regular communication between teachers to discuss student progress and needs, sharing of resources and instructional strategies, and co-planning and co-teaching lessons.

Professional Development

In addition, the study highlights the need for teacher training and professional development on effective collaboration strategies. Many teachers may not have experience working collaboratively with another teacher and may not know how to develop and maintain a productive co-teaching relationship. Professional development can provide teachers with the knowledge and skills needed to collaborate effectively, such as effective communication strategies,

conflict resolution techniques, and co-planning and co-teaching strategies. This can ultimately lead to better student outcomes in inclusive classrooms.

Firstly, teacher training and professional development are important for equipping teachers with the necessary skills and knowledge to collaborate effectively. Inclusive classrooms require teachers to have a deep understanding of students' diverse needs and how to support them. Teachers must also be able to collaborate with other professionals, such as special education teachers, speech and language pathologists, and school psychologists, to ensure that all students receive the support they need. Without the proper training and support, teachers may lack the skills and confidence needed to collaborate effectively.

One example of effective teacher training and professional development is co-teaching training. Co-teaching is a collaborative approach that involves two or more teachers working together to plan, teach, and assess students. Co-teaching can be used in inclusive classrooms to provide support to all students, including those with diverse needs. Teachers who receive co-teaching training learn how to work together to develop effective strategies for instruction and assessment. They also learn how to communicate effectively and provide support to each other. Co-teaching training can lead to improved student outcomes and a positive classroom environment.

Secondly, teacher training and professional development can provide teachers with the opportunity to reflect on their practice and improve their skills. Collaboration requires teachers to be open to feedback and willing to learn from each other. Professional development opportunities, such as workshops and conferences, can provide teachers with the opportunity to reflect on their practice and learn new strategies for collaboration. For example, workshops on effective communication can help teachers to improve their ability to communicate with each other and with parents. Professional development opportunities can also provide teachers with the opportunity to share their experiences and learn from each other.

Moreover, teacher training and professional development can help to create a culture of collaboration within schools. Collaboration requires a supportive culture in which teachers are encouraged to work together and share their knowledge and expertise. Professional development opportunities can help to create this culture by providing teachers with the opportunity to work together and learn from each other. By creating a culture of collaboration, schools can improve student outcomes and create a positive working environment for teachers.

Additionally, teacher training and professional development can help to address the challenges and barriers to collaboration. Collaboration can be challenging, particularly in inclusive classrooms where teachers may have different backgrounds and areas of expertise. Professional development opportunities can help teachers to identify and address these challenges. For example, workshops on cultural competency can help teachers to understand and address the cultural barriers that may exist between them. By addressing these challenges, schools can create a more collaborative and supportive environment for teachers and students.

Finally, teacher training and professional development can support the implementation of collaborative practices in schools. Collaborative practices require a significant investment of time and resources, including training and support for teachers. Professional development opportunities can provide teachers with the necessary training and support to implement collaborative practices effectively. This can lead to improved student outcomes and a positive working environment for teachers.

Continued Research

Another implication of the study is the need for continued research on the relationship between cooperative co-teaching and student achievement in

inclusive classrooms. While this study found a positive correlation between cooperative co-teaching and student outcomes, further research is needed to better understand the causal relationship between these variables. Future research can also investigate the impact of other factors, such as teacher experience and training, on the effectiveness of cooperative co-teaching in inclusive classrooms.

Future research could be beneficial in exploring the long-term effects of cooperative co-teaching on student outcomes. While the current study found a positive correlation between cooperative co-teaching and student achievement, it is important to determine whether these benefits are sustained over time. In effort to further explore this topic, researchers could conduct longitudinal studies that track the progress of students who have received instruction through cooperative co-teaching over a period of several years. By comparing the outcomes of these students to those who received traditional instruction methods, researchers could determine whether the benefits of cooperative co-teaching are seen over the course of more than one academic year.

In addition to exploring the long-term effects of cooperative co-teaching on student outcomes, future research could also investigate the impact of cooperative co-teaching on students with different learning needs. While the

current study found that cooperative co-teaching was effective for improving outcomes for students with and without disabilities, more research is needed to explore the effectiveness of this strategy for different subgroups of students. For an example, researchers could investigate the effectiveness of cooperative co-teaching for students who are English language learners or for students who have been identified as gifted and talented. By exploring the effectiveness of cooperative co-teaching for these different subgroups of students, researchers can help to identify strategies that are most effective at meeting the diverse learning needs of all students in inclusive classrooms.

Another implication of where future research could be beneficial is exploring the effectiveness of cooperative co-teaching in different contexts. While this study was conducted in a single school district, it is important to determine whether cooperative co-teaching is effective in other contexts, such as different grade levels or in schools with different demographics. The research outcomes begs to ask whether researchers could conduct studies in different school districts or in schools with different demographics with the same or similar conclusions. By comparing the outcomes of students who receive cooperative co-teaching in these different contexts, researchers could determine a stronger perspective on whether this strategy is effective across different settings.

In addition to exploring the effectiveness of cooperative co-teaching in different contexts, future research could also investigate the impact of cooperative co-teaching on parent and family involvement. While the current study did not explore this topic, it is possible that cooperative co-teaching could help to promote greater involvement from parents and families in the education of their children. Potential researcher could conduct surveys or interviews with parents and families to gather information about their experiences with cooperative co-teaching. Researchers could then use this information to explore the relationship between cooperative co-teaching and parent and family involvement.

Inclusion Setting

One of the most significant implications is that the collaborative co-teaching relationship can have a positive impact on student achievement specifically in inclusive classrooms. This finding is consistent with previous research, which has found that collaboration between special education and general education teachers can lead to improved student outcomes (Friend & Cook, 2016). However, unlike other studies, this study extends this research by specifically examining the impact of collaborative co-teaching in the context of inclusion classrooms, which are becoming increasingly common in U.S. schools.

With this, it is implied that teacher collaboration is essential for effective implementation of the inclusion model. As noted earlier, the inclusion model has become the forefront of educating students with special needs in U.S. public schools. However, for the model of inclusion to be carried out successfully, it is important that general education and special education teachers collaborate effectively. This study shows that when cooperative co-teaching is present in the inclusion classroom, students achieve higher scores on the EOG math test. Thus, school districts and educators who work in inclusive classrooms should strive to promote collaborative relationships between special education and general education teachers. To promote effective collaboration between teachers, school districts and educators who work in inclusive classrooms should strive to create a culture of collaboration. This can be achieved by providing opportunities for teachers to work together, such as regular team meetings and co-planning time. It can also be achieved by providing ongoing professional development on co-teaching strategies and differentiated instruction.

In addition to promoting teacher collaboration, it is also important to involve parents and other stakeholders in the inclusion model. Parents of students with disabilities can be valuable partners in the education process, providing insight into their child's strengths and needs. They can also provide

support at home to reinforce the skills and knowledge learned in the classroom. Other stakeholders, such as community members and local businesses, can provide resources and support to help ensure the success of the inclusion model.

Another important aspect that the results of the study implies, is whether there is a clear understanding of inclusion principles. The successful implementation of this model depends on a clear understanding of the research-based standards and effective strategies for its implementation. Educators need to be aware of the principles and practices that underlie the inclusion model to effectively implement it in their classrooms. This includes knowledge of strategies for co-teaching, differentiated instruction, and accommodations and modifications to the curriculum.

A study by Wolery et al. (2009) found that teachers who received training on the inclusion model were better equipped to implement the model in their classrooms. The study also found that teachers who received training were more likely to report positive attitudes toward the inclusion of students with disabilities in their classrooms. This suggests that not only training but a clear understanding on the inclusion model can play a crucial role in its successful implementation.

In addition to training, effective implementation of the inclusion model also requires support from school administrators and policymakers. School leaders need to create a supportive and inclusive environment that promotes the success of all students. This includes providing resources and support for teachers, such as access to technology and materials to differentiate instruction. It also includes creating policies that promote inclusion and address any barriers to its implementation, such as inadequate funding or lack of support from parents or community members.

Another implication of the inclusion model is that it can have a positive impact on the social and emotional well-being of students with disabilities. Research has shown that students with disabilities who are included in general education classrooms have higher levels of social competence and self-esteem than those who are in segregated classrooms (Hendrickson & Gable, 1999). Inclusive classrooms also provide opportunities for students with disabilities to form relationships with their peers and develop a sense of belonging.

However, it is important to note that the success of the inclusion model in promoting the social and emotional well-being of students with disabilities depends on the extent to which they are fully integrated into the classroom community. A study by Preissler et al. (2010) found that students with

disabilities who were only partially integrated into the classroom community had lower levels of social competence and self-esteem than those who were fully integrated. This highlights the importance of ensuring that students with disabilities are fully included and supported within the total scholastic environment.

Effective implementation of the inclusion model also requires a commitment to equity and social justice. The inclusion model is based on the principle that all students, regardless of their abilities or disabilities, have the right to a high-quality education. This requires that educators and policymakers address issues of equity and access to education, including disparities in funding and resources for schools in low-income and marginalized communities. A study by Gao and Sindelar (2013) found that the implementation of the inclusion model was more successful in schools with a high level of commitment to equity and social justice. This suggests that a commitment to equity and social justice is crucial for the effective implementation of the inclusion model.

Administration

Moreover, this study suggests that school administrators should provide opportunities for teacher collaboration, as this can be an effective form of professional development. Fullan (2007) has argued that effective collaboration is

the best sign of staff development, and the results of this study support this claim. In addition to improving student outcomes, collaborative co-teaching can also lead to greater teacher satisfaction, increased engagement, and improved problem-solving skills (Villa, Thousand, & Nevin, 2008). Thus, administrators should provide professional development opportunities that encourage teacher collaboration and communication. This can include opportunities for teachers to meet and discuss instructional strategies, co-plan lessons, and engage in joint professional development activities. Dufour (2003) emphasized that teachers must have the opportunity to analyze and improve their teaching strategies, as well as encouraging teachers to interact with colleagues and establish good working relationships with them. Bunker recommends that researchers continually evaluate teaching practices to make necessary adjustments. For non-collaborative co-teaching partnerships, it is important to establish formal programs that allow teachers to collaborate with one another. Collaboration can create a positive and rewarding learning community, and regular meetings and online communication can facilitate information exchange among teachers. School administration plays a crucial role in improving teacher collaboration, as they must observe the performance of teachers as a team, modify assignments, and recognize the strengths and weaknesses of every teacher team.

The implications of school administrator's role cannot be emphasized enough. They play a critical role in the successful implementation of the inclusion model. One of the most significant implications of the inclusion model for school administrators is the need for effective leadership. Effective leadership is essential for creating a culture of inclusion that values the participation of all students in the educational process. This includes the development of policies and practices that promote inclusion and address any barriers to its implementation, such as inadequate funding or lack of support from parents or community members.

A study by Villa, Thousand, & Nevin (2008) found that school administrators who provided strong leadership and support for the inclusion model were more likely to have successful implementations in their schools. The study also found that school administrators who supported the inclusion model were more likely to have positive attitudes toward students with disabilities and were more likely to promote their participation in extracurricular activities. This suggests that effective leadership is crucial for the successful implementation student achievement within the inclusion model.

Another implication of the inclusion model for school administrators is the need for collaboration and teamwork. The inclusion model emphasizes the

importance of collaboration between general education and special education teachers, as well as other professionals, such as speech therapists and occupational therapists. This requires school administrators to create a supportive environment that promotes collaboration and teamwork among all members of the educational community.

A study by Schumaker et al. (2007) found that collaboration and teamwork were essential for the successful implementation of the inclusion model. The study found that teachers who worked collaboratively were more likely to report positive attitudes toward the inclusion of students with disabilities in their classrooms. More importantly, this study also found that collaboration between teachers and other professionals, such as speech therapists and occupational therapists, was essential for meeting the individual needs of students with disabilities.

To promote collaboration and teamwork, school administrators can create opportunities beyond professional development and training that emphasize the importance of collaboration and provide strategies for effective teamwork. They can strive to create structures and processes that promote collaboration, such as team-teaching models or allocated meetings between general education and special education teachers.

Another important implication of the student achievement in the inclusion model is for school administrators to lend resources and support to co-teaching partnerships to aid in collaborative methods. Implementing the inclusion model requires a significant investment in resources, including materials, technology, and personnel. School administrators need to provide the necessary resources and support to ensure that teachers have the tools they need to effectively implement the inclusion model and increase collaboration among both special educator and regular education teacher.

A study by Sindelar et al. (2006) found that the provision of resources and support was essential for the successful implementation of the inclusion model. The study found that teachers who had access to resources and support, such as training, materials, and personnel, were more likely to report positive attitudes toward the inclusion of students with disabilities in their classrooms. The study also found that the provision of resources and support was essential for meeting the individual needs of students with disabilities which in turn increases student achievement outcomes. To provide resources and support, school administrators can allocate funds for materials and technology that support the inclusion model, such as assistive technology or adaptive equipment. They can also provide personnel, such as paraprofessionals or support staff, to assist teachers in

meeting the individual needs of students with disabilities. Additionally, they can provide training and professional development to teachers on the use of these resources and on strategies for meeting the individual needs of students with disabilities.

Finally, the inclusion model has important implications for school administrators in terms of the evaluation and monitoring of its implementation. School administrators need to have a system in place for evaluating the effectiveness of the inclusion model in their schools and monitoring its implementation to ensure that it is being carried out effectively. A study by Lashley and Boscardin (2015) found that school administrators who had systems in place for evaluating the implementation of the inclusion model were more likely to have successful implementations in their schools. The study also found that school administrators who monitored the implementation of the inclusion model were more likely to identify and address barriers to its implementation, such as inadequate resources or lack of support from parents or community members.

To evaluate and monitor the effective co-teaching collaboration and implementation of the inclusion model, school administrators can use a variety of tools, such as surveys or classroom observations, to gather feedback from

teachers, students, and parents. They can also use data on student achievement and behavior to evaluate the effectiveness of the inclusion model in meeting the individual needs of students with disabilities.

In addition to these implications, there are also challenges that school administrators may face in implementing the inclusion model. One of the most significant challenges is the resistance of some teachers and parents to the inclusion of students with disabilities in the general education classroom. This resistance may be due to concerns about the ability of students with disabilities to succeed academically, or about the impact of their presence on the learning environment. A study by Hodapp et al. (2018) found that school administrators who were successful in implementing the inclusion model were those who addressed these concerns by providing training and support to teachers and parents, and by creating a culture of inclusion that emphasized the benefits of inclusion for all students. To address resistance to the inclusion model, school administrators can provide training and professional development to teachers and staff on strategies for meeting the individual needs of students with disabilities in the general education classroom. They can also provide information and resources to parents on the benefits of inclusion for all students

and engage them in the educational process by involving them in decision-making about their child's education.

Instructional Practices

This study and highlights the concept that teacher collaboration can lead to improved instructional practices. When general education and special education teachers collaborate, they can share their expertise and knowledge of teaching strategies, which can lead to more effective instructional practices in the classroom. For example, a general education teacher might have expertise in teaching mathematical concepts, while a special education teacher might have expertise in modifying instruction for students with disabilities. When these teachers collaborate, they can combine their knowledge and skills to create effective instruction for all students in the classroom.

General education teachers are typically responsible for teaching the core academic subjects, such as math, science, and language arts. These teachers have expertise in the content areas and are familiar with the curriculum standards and expectations for each grade level. On the other hand, special education teachers have expertise in modifying instruction and accommodations for students with disabilities to access the general education curriculum. They have knowledge of different learning styles and strategies to support student learning. When these

two groups of teachers collaborate, they can bring their expertise together to create effective instruction that meets the needs of all diverse needs of the inclusion students.

A study by DeSimone and Parmar (2017) found that collaboration between general education and special education teachers can lead to improved instructional practices, such as more effective use of differentiation and co-teaching. This study suggests that when general education and special education teachers collaborate, they can share their knowledge and skills to create effective instruction for all students.

Another study by Avramidis et al. (2003) found that collaboration between general education and special education teachers can lead to improved instructional practices, such as more effective use of technology and greater use of peer tutoring. This study suggests that collaboration between general education and special education teachers can lead to improved instructional practices that benefit all students, not just those with disabilities.

Moreover, research suggests that collaboration can improve teacher attitudes and beliefs about inclusion. Giangreco et al. (2010) found that teachers who engaged in collaborative co-teaching reported more positive attitudes towards inclusion and greater belief in their ability to effectively educate

students with disabilities in the general education classroom. This suggests that collaboration can not only improve instructional practices but also foster a more inclusive and supportive learning environment for all students.

One study by Alquraini and Gut (2012) found that inclusion teachers who had expertise in a specific content area were better able to differentiate instruction for students with disabilities in that area. The study suggests that having subject matter expertise can help inclusion teachers modify and adapt instruction to meet the diverse needs of students with disabilities.

Similarly, a study by Tawil and Harley (2018) found that inclusion teachers who had expertise in a specific content area were more confident in their ability to teach that subject to students with disabilities. The study suggests that having subject matter expertise can help inclusion teachers feel more prepared and competent in meeting the needs of students with disabilities in their content area.

In addition, research suggests that collaboration between inclusion teachers and content area specialists can be beneficial in meeting the needs of students with disabilities. A study by Causton-Theoharis and Malmgren (2005) found that collaboration between inclusion teachers and content area specialists led to more effective modifications and accommodations for students with

disabilities. The study suggests that having both inclusion teachers and content area specialists working together can lead to more effective instruction for students with disabilities.

Teacher Obstacles and Motivation

The study suggests that despite the benefits of teacher collaboration, there are several obstacles and challenges that schools must consider. For example, some teachers may not want to collaborate with their colleagues due to common school culture that promotes isolationism. The school administration must also give constant attention and effort in supporting teacher collaboration to ensure its success. Difficulties may also arise from an improper balance between teacher autonomy and collaboration, as well as individual backgrounds of the teachers, departmental politics, and interpersonal relations.

One major implication of the study highlights the obstacle for teacher collaboration is the school culture that promotes isolationism. In many schools, teachers work in silos and have limited interaction with their colleagues. This culture can discourage collaboration and hinder the implementation of the inclusion model. A study by Beck et al. (2017) found that the culture of the school was a significant predictor of teacher collaboration, and schools that had a culture of collaboration were more likely to have effective collaboration between

teachers. Therefore, it is important for school leaders to promote a culture of collaboration that values the input and expertise of all teachers.

Another challenge to effective collaboration is finding the right balance between teacher autonomy and collaboration. Teachers may feel that collaboration limits their autonomy and creativity in the classroom, and they may be hesitant to work with their colleagues if they feel that their ideas and opinions are not being heard or valued. On the other hand, collaboration can lead to shared ideas and best practices, which can improve the quality of instruction and lead to better outcomes for students. A study by Sindelar et al. (2010) found that effective collaboration between teachers required a balance between autonomy and collaboration, and that collaboration worked best when teachers were given the freedom to express their ideas and opinions while also working together to achieve common goals.

Individual backgrounds of teachers, departmental politics, and interpersonal relations can also create obstacles to effective collaboration. Teachers may come from different educational backgrounds and have different teaching styles, which can lead to conflicts and disagreements. Additionally, departmental politics and power struggles can create barriers to collaboration, as teachers may be reluctant to work with colleagues who they perceive as a threat

to their own power or status. Finally, interpersonal relations can also play a role in collaboration, as teachers who do not get along may be less likely to collaborate effectively. A study by Brinkman et al. (2016) found that interpersonal relations between teachers were an important factor in the success of collaboration, and that schools that fostered positive relationships between teachers had more effective collaboration.

Conclusion

Successful schools are those that have implemented collaboration practices, where both teachers and students work together with the common goal of improving themselves. Collaboration practices serve as a strong foundation for better learning and teacher satisfaction. In conclusion, teacher collaboration is a promising approach to improving education, but schools must be prepared to address the obstacles and challenges that come with it. With careful planning and implementation, teacher collaboration can create a positive and rewarding learning community that benefits both teachers and students.

This study provides important insights into the impact of collaborative co-teaching on student achievement in the context of inclusion classrooms. The findings suggest that collaborative co-teaching can have a positive impact on student achievement, and that teacher collaboration is essential for effective

implementation of the inclusion model. School administrators should provide opportunities for teacher collaboration, as this can be an effective form of professional development and should provide support. Overall, the study has important implications for educators and policymakers who are working to improve student outcomes in inclusive classrooms. The findings suggest that fostering collaborative co-teaching relationships between general and special education teachers can have a positive impact on student achievement. This can be achieved through prioritizing teacher collaboration in inclusive classrooms, providing professional development on effective collaboration strategies, and continued research to better understand the relationship between cooperative co-teaching and student outcomes.

Recommendations

The success of an instructional program in a school community heavily relies on the collaborative relationships among educators. Positive relationships foster effective cooperation and communication, leading to a learning community where teachers remain reliable and promote student performance and achievement outcomes. To achieve this, shared facilitative leadership, aligned rigorous curriculum, effective instructional practice, time, and organizational structures should come together. Collaboration among teachers in

all districts of North Carolina schools is worth pursuing as it enhances critical and creative thinking, improves self-esteem, social skills, and outlook towards subjects, and helps teachers better understand the needs of their students, ultimately hastening learning acquisition. However, most teachers may not be aware of the best way to implement collaboration towards increasing student achievement, resulting in a lack of benefits. Thus, schools should adopt the recommendations of the Teacher Collaboration Improvement Framework, which raises collaboration literacy, identifies communities of practice, reconfigures teacher teams, assesses quality of collaboration, makes corrections, and recognizes accomplishments. Creating a successful teaching collaboration community involves everyone working together, leading to improvements in subject matter, assessments, material support, departmental meetings, test scores, and creative student activities. Recommendations of the study are proposed under two frameworks, continued research as well as recommendations for practice.

Recommendations for Research:

Develop more rigorous research designs:

To address the issue of causation versus correlation, future studies should use more rigorous research designs. For example, randomized controlled trials

(RCTs) can provide stronger evidence of causation than quasi-experimental designs. In an RCT, researchers can randomly assign schools or teachers to either a treatment group that receives collaborative professional development or a control group that does not. The impact of collaboration on student achievement can then be measured by comparing the achievement of students in the treatment group to that of students in the control group. One study that used an RCT to examine the impact of teacher collaboration on student achievement found that collaborative professional development led to significant improvements in student achievement (Kraft et al., 2018). RCTs can provide valuable insights into the impact of teacher collaboration on student achievement and should be used more frequently in future research.

Use objective measures of teacher collaboration:

To address the issue of self-reported measures, it is recommended that future studies should use objective measures of teacher collaboration. Objective measures can include classroom observations, surveys of teachers' colleagues, or analysis of teachers' emails or meeting schedules. Using objective measures can help ensure the accuracy of data and reduce the potential for bias or inaccuracies in self-reported measures. One study that used objective measures to assess teacher collaboration found that teachers who participated in collaborative

professional development had higher levels of collaboration than those who did not (Goddard et al., 2015).

Develop a consensus on definition and measurement:

One consistent argument of measuring teacher collaboration is the lack of consensus on definition and measurement. Future studies should work towards developing a consensus on how to define and measure teacher collaboration. This can involve developing a standardized measure of teacher collaboration that can be used across studies. This study measured teacher collaboration using the TCAS which is a research-based measurement for school communities seeking to evaluate collaboration. This was a strength of the study, and we recommend further research using similar standardized measurements. Another positive example of a well-defined measurement of teacher collaboration is the Teacher Collaboration Index (TCI), which is standardized measure of teacher collaboration that has been used in several studies (e.g., Kraft et al., 2018; Goddard et al., 2015). The TCI includes items such as "I frequently discuss my teaching practices with my colleagues" and "I frequently observe my colleagues' teaching practices." Developing a standardized measure of teacher collaboration can help ensure consistency across studies and improve the comparability of findings.

Conduct studies in diverse contexts:

When looking at limitations of the study, it is recommended that future research addressed the issue of limited generalizability. Continued research should be conducted in diverse contexts, including different geographic regions, school districts, and school types. For example, a study conducted in a rural school district may find different results than a study conducted in an urban district. By conducting studies in diverse contexts, researchers can better understand the impact of teacher collaboration in different settings and identify factors that may moderate the relationship between collaboration and student achievement.

In addition to geographical contexts, it is also important to consider other contextual factors that may impact the effectiveness of collaboration, such as class size, student demographics, and school culture. Future studies should also consider these diverse factors to provide a more comprehensive understanding of the relationship between collaboration and student achievement.

Measure the impact of collaboration over the long term:

Similarly, a limitation in this study was that teacher collaboration and student achievement outcomes were assessed over the course of one academic year. Future studies should measure the impact of teacher collaboration over the

long term. This can involve conducting longitudinal studies that follow students over several years and measure the impact of teacher collaboration on their achievement over time. It is unclear whether the benefits of collaboration are sustained over the long term or if they dissipate over time. However, one study that measured the impact of collaborative professional development over three years found that students in schools that received the professional development had significantly higher math achievement than students in schools that did not (Borko et al., 2015). With this, there is a strong argument for the need of more long-term studies in the field.

Assess the impact of collaboration across different subject areas:

It is recommended that future studies should assess the impact of collaboration across different subject areas. This can involve conducting studies that examine the impact of collaboration on student achievement in different subjects, such as science, social studies, and the arts. One of the limitations of the current research on teacher collaboration and student achievement is the study focuses on the single subject area of mathematics. While these studies have provided important insights into the impact of collaboration on student achievement in specific subjects, it is unclear whether the findings can be generalized to other subject areas. Therefore, there is a need for future research to

explore the impact of collaboration on student achievement across different subject areas.

There is some evidence to suggest that collaboration may have a different impact on student achievement in different subject areas. One study by Johnson and Johnson (2009) found that collaborative learning was more effective in promoting achievement in science and social studies than in math and language arts. The authors suggest that this may be due to the fact that science and social studies require more complex thinking and problem-solving skills that are better developed through collaboration.

Similarly, a study by Eddy et al. (2015) found that collaboration was more effective in promoting student achievement in biology than in physics. The authors suggest that this may be because biology involves more conceptual and qualitative reasoning, which is better developed through collaboration.

In contrast, a study by DeBacker et al. (2015) found that collaborative learning had a positive impact on student achievement in math, but not in science. This suggests that this may because math involves more procedural and algorithmic reasoning, which may not be as well suited to collaborative learning.

Overall, these studies suggest that the impact of collaboration on student achievement may vary across different subject areas. Therefore, future research

should consider the subject area when examining the impact of collaboration on student achievement. This will help to provide a more nuanced understanding of the relationship between collaboration and student achievement and inform effective teaching practices across different subject areas.

Recommendations for Practice:

Training and Professional Development:

One of the most important recommendations for practice is providing training and professional development to teachers on the inclusion model of education. Teachers need to be equipped with knowledge and skills on the principles and practices that underlie the inclusion model to effectively implement it in their classrooms. This includes knowledge of strategies for co-teaching, differentiated instruction, and accommodations and modifications to the curriculum.

A study by Wolery et al. (2009) found that teachers who received training on the inclusion model were better equipped to implement the model in their classrooms. The study also found that teachers who received training were more likely to report positive attitudes toward the inclusion of students with disabilities in their classrooms. This suggests that training and professional development on the inclusion model can play a crucial role in its successful

implementation. Moreover, it is essential to provide ongoing professional development opportunities for teachers to maintain their knowledge and skills.

Collaborative co-teaching is a key component of the inclusion model, and this study suggests that it can have a significant impact on student achievement in inclusive classrooms. However, for the inclusion model to be carried out successfully, it is important that general education and special education teachers collaborate effectively. This requires a culture of collaboration, ongoing professional development, and support from school administrators. However, teachers need to be aware of the benefits of collaboration and how it can be used to promote student learning. In addition, they need to be equipped with the necessary skills and knowledge to implement collaborative practices effectively. To this end, schools can provide training and professional development opportunities for teachers to enhance their collaboration literacy. This can include workshops, conferences, and peer mentoring programs that focus on collaborative practices such as lesson planning, curriculum development, and assessment design.

Despite the benefits of teacher collaboration, there are several obstacles and challenges that schools must consider. For example, some teachers may not want to collaborate with their colleagues due to a common school culture that

promotes isolationism. The school administration must also give constant attention and effort in supporting teacher collaboration to ensure its success. Difficulties may also arise from an improper balance between teacher autonomy and collaboration, as well as individual backgrounds of the teachers, departmental politics, and interpersonal relations.

Supportive and Inclusive Environment:

In reflection of the current study, it is recommended that schools need to create a supportive and inclusive environment that promotes the success of all students. This includes providing resources and support for teachers, such as access to technology and materials to differentiate instruction. It also includes creating policies that promote inclusion and address any barriers to its implementation, such as inadequate funding or lack of support from parents or community members.

Moreover, students with disabilities should be fully integrated into the classroom community. A study by Preissler et al. (2010) found that students with disabilities who were only partially integrated into the classroom community had lower levels of social competence and self-esteem than those who were fully integrated. In addition, it is recommended that administrators identify communities of practice within the schools. Communities of practice are groups

of teachers who share common goals and interests and who come together to learn from one another. By identifying these communities, schools can provide opportunities for teachers to collaborate and share best practices in a structured and supportive environment. For example, teachers who are interested in project-based learning can form a community of practice and work together to develop and implement innovative project-based learning activities.

Supporting an inclusive environment comes with the notion of social justice and equity. A study by Gao and Sindelar (2013) found that the implementation of the inclusion model was more successful in schools with a high level of commitment to equity and social justice. This suggests that a commitment to equity and social justice is crucial for the effective implementation of the inclusion model and an overall inclusive school culture. Thus, school administrators should foster a culture of collaboration by creating policies that promote inclusion and address any barriers to its implementation, such as inadequate funding or lack of support from parents or community members.

Team Collaboration on the IEP Development

Considering the current study and outcomes, one must address the Individualized Education Programs (IEPs), and the need for regular education

teacher to be an integral part in developing classrooms goals alongside the special education teacher. The IEPs are a crucial tool to help students with disabilities receive an education tailored to their unique needs. These programs, which are mandated by federal law, outline specific goals and objectives for each student, as well as the accommodations and modifications needed to help them reach those goals, often within the inclusion classroom. While IEPs are typically developed and overseen by special education teachers, research has shown that involving regular education teachers in the IEP process can lead to more effective collaboration and better outcomes for students.

One study, published in the Journal of Disability Policy Studies, found that when regular education teachers were involved in the IEP process, they were more likely to be aware of their students' individual needs and more likely to provide accommodations and modifications in the classroom (Liu & Solek-Tefft, 2012). This increased collaboration also led to greater satisfaction among both regular and special education teachers, as well as improved student outcomes.

Another study, published in the Journal of Special Education Leadership, found that regular education teachers who participated in IEP meetings were more likely to feel that they had a clear understanding of their students' goals

and objectives, as well as the specific accommodations and modifications needed to support their learning (McLeskey, Tyler, & Saunders, 2000). This increased understanding and collaboration led to better communication and coordination between regular and special education teachers, which in turn led to improved student outcomes in the inclusion classroom.

Involving regular education teachers in the IEP process can also help to address the issue of "inclusion fatigue," which occurs when special education teachers feel overwhelmed by the demands of meeting the needs of all their students (Waldron & McLeskey, 2010). When regular education teachers are involved in the IEP process, they can help to share the responsibility of meeting the needs of students with disabilities, which can lead to a more sustainable and effective model of inclusion.

Recommendations for Involving Regular Education Teachers in the IEP Process

1. Provide Professional Development: Regular education teachers may not have experience with the IEP process or working with students with disabilities. Providing professional development on the IEP process and strategies for working with students with disabilities can

help prepare regular education teachers for their role in the IEP process.

2. Foster Collaboration: Foster a culture of collaboration between special education and regular education teachers. Encourage regular education teachers to share their knowledge and expertise about the student with the IEP. Provide opportunities for collaboration, such as regular team meetings and joint planning sessions.
3. Clarify Roles and Responsibilities: Clearly define the roles and responsibilities of each member of the IET, including regular education teachers. Make sure regular education teachers understand their role in the IEP process and what is expected of them.
4. Communicate Effectively: Effective communication is key to involving regular education teachers in the IEP process. Ensure that regular education teachers are kept informed about the student's progress and any changes to the IEP. Encourage regular communication between special education and regular education teachers.
5. Use Technology: Use technology to facilitate communication and collaboration between special education and regular education teachers. Online platforms, such as Google Classroom or Microsoft

Teams, can be used to share information and resources, plan lessons, and collaborate on the IEP.

Administrative Support

Examining the results of this study and the review of relevant literature, it is recommended that administrators take an active role in facilitating collaboration in the total school environment. When doing so, administrators create a supportive and inclusive school culture as previously discussed. This involves promoting a sense of community and belonging among all students and staff, regardless of their abilities or backgrounds. Administrators can foster such a culture by promoting inclusive practices such as universal design.

Another way to achieve an inclusive school culture is for administration to reconfigure teacher teams to promote collaboration. Traditional departmental structures may not always be conducive to collaboration, as teachers may work in isolation from one another. By reconfiguring teacher teams, schools can create opportunities for teachers to work together and share ideas. For example, schools can create interdisciplinary teams that include teachers from different subject areas to work together on projects and activities that integrate multiple subject areas.

In addition, administrators can facilitate collaboration among inclusion teachers is by providing regular opportunities for them to meet and discuss student progress, share instructional strategies, and plan lessons together. Such meetings can be organized in various formats, such as departmental meetings, team meetings, or Professional Learning Communities (PLCs). PLCs have been shown to be effective in promoting collaboration and improving student achievement in inclusive settings (Gately & Gately, 2001; Hopkins et al., 2013).

PLCs are groups of teachers who share a common interest or focus and work collaboratively to improve their practice and student outcomes. Inclusive PLCs can focus on a range of topics, such as developing individualized education plans (IEPs), differentiating instruction, using assistive technology, and promoting social and emotional learning. The key is that they provide a structured and supportive space for inclusion teachers to learn from one another, share their expertise, and develop a shared vision for inclusive education.

Furthermore, this study recommends that administrators assess the quality of collaboration and make corrections as needed. Schools can use a variety of assessment tools to evaluate the effectiveness of collaborative practices, such as surveys, focus groups, and peer evaluations. Based on the results of these assessments, administrators can identify areas where improvements are needed

and provide targeted support to teachers, departments, and co-teaching partnerships.

While quality assessment is crucial to implement, one must also acknowledge the need to recognize and celebrate accomplishments. Teachers who collaborate effectively should be recognized for their efforts and accomplishments. This can include awards, public recognition, and opportunities to share their successes with others. By recognizing and celebrating collaboration, schools can promote a culture of collaboration and encourage more teachers to engage in collaborative practices.

Conclusion

Special Education the United States has undergone significant changes in recent years, with the implementation of new guidelines and mandates. The concept of the Least Restrictive Environment (LRE) has become the norm in most districts, aiming to provide special education students with opportunities to learn alongside their non-disabled peers as much as possible. This has led to the development of the inclusion model, which promotes co-teaching and collaboration between regular education and special education teachers in the same classroom. While the inclusion model has shown positive outcomes in

terms of inclusive and harmonious intentions, there have also been instances where it has failed students who require additional support.

This research sought to examine the impact of a cooperative co-teaching relationship between special education and regular education teachers in the inclusion classroom on student performance, specifically in the context of mathematics instruction in 7th grade. The study measured student performance using the North Carolina 7th grade End-of-Grade (EOG) Mathematics test, while assessing co-teachers' collaboration using the Teacher Collaboration Assessment Survey (TCAS). Research on the relationship between teacher collaboration and student achievement provides important insights into effective teaching practices. The evidence suggests that teacher collaboration can have a positive impact on student achievement, particularly in high-needs inclusion classes and with students with disabilities. However, it is important to interpret these findings with caution and to consider the limitations of the research design and measures used. To address these limitations, researchers should strive to use objective measures of teacher collaboration, develop a standardized definition, and set of measures for teacher collaboration, conduct longitudinal studies to assess the long-term impact of collaboration on student achievement, and assess the impact of collaboration across multiple subject areas. By doing so, researchers

can provide a more nuanced understanding of the complex relationship between teacher collaboration and student achievement, and educators can develop more effective collaboration strategies to improve student outcomes.

Effective cooperation and communication among educators are crucial in promoting student performance in a learning community. Jackson and Davis (2000) suggest that teaching and learning are more meaningful when positive relationships exist among everyone involved. Teachers and students acquire necessary social and emotional tools through effective cooperation and communication, leading to a classroom that promotes reliable teachers. Reeves (2003) argues that shared facilitative leadership, aligned rigorous curriculum, effective instructional practice, time, and organizational structures are necessary to promote student performance.

Collaboration among teachers in schools is beneficial in enhancing critical and creative thinking among students, improving their self-esteem, social skills, and outlook towards their subjects, and hastening learning acquisition (Brown & Knowles, 2007; DelliCarpini, 2008). However, Johnson and McCafferty (n.d.) suggest that most teachers view collaboration as tedious and burdensome, leading to a lack of benefits. To achieve successful collaboration, teachers need to

understand how to implement it towards increasing student achievement (Corcoran et al., 2003).

The Teacher Collaboration Improvement Framework by Gajda and Koliba (2008) offers recommendations on how to administer, evaluate, and improve teacher collaboration. The framework involves raising collaboration literacy, identifying communities of practice, reconfiguring teacher teams, assessing quality of collaboration, making corrections, and recognizing accomplishments. Adopting these recommendations will help schools improve collaboration practices and ultimately lead to student achievement. While not all stages or practices have been assessed in the current study, schools that preclude teacher collaboration practices may benefit from adopting these recommendations.

This research study has shown a positive correlation between teacher collaboration and improved student performance on assessments such as the End-of-Grade (EOG) math test. Given the importance of student achievement, it is essential that schools implement effective strategies for promoting teacher collaboration. In this regard, the present study provides valuable insights into the challenges and opportunities associated with promoting teacher collaboration in North Carolina schools. By measuring the effect of collaboration on student performance using standardized assessments, the study contributes to

the existing knowledge base and informs educational practices. The results will help identify the benefits of cooperative co-teaching and provide evidence-based recommendations for improving collaboration in inclusive settings.

Ultimately, the goal is to create an inclusive educational environment that supports the diverse needs of all students. By fostering effective collaboration between co-teachers, schools can enhance instructional practices, meet individual student needs, and promote positive learning outcomes for all students in the inclusion classroom.

The findings of this study underscore the importance of teacher collaboration in achieving these goals and highlight the potential benefits it can bring to students with disabilities and those in high-needs inclusion classes. One of the key benefits of teacher collaboration is the promotion of critical and creative thinking among students. When teachers work together, they can bring different perspectives and ideas to the table, creating a rich learning environment that encourages students to think deeply and explore new concepts. By incorporating diverse teaching strategies and approaches, co-teachers can cater to the individual learning styles and needs of students, ensuring that they are engaged and motivated to learn.

Furthermore, teacher collaboration has been found to improve students' self-esteem and social skills. In an inclusive classroom, students with disabilities often face challenges in building relationships and feeling included. However, when regular education and special education teachers collaborate effectively, they can create a supportive and inclusive classroom culture where all students feel valued and accepted. By modeling positive interactions and providing targeted support, co-teachers can help students develop their social skills and improve their self-confidence, leading to overall positive well-being.

In addition to social and emotional benefits, collaboration among teachers can also expedite the acquisition of knowledge and skills. When teachers work together, they can share best practices, exchange resources, and brainstorm effective instructional strategies. This collective expertise enhances the quality of instruction and enables students to access a broader range of learning opportunities. Through collaboration, teachers can identify and address gaps in student understanding, provide timely interventions, and differentiate instruction to meet the diverse needs of students. As a result, students receive a more comprehensive and tailored education that facilitates their learning and academic growth.

Despite the numerous benefits of teacher collaboration, it is essential to acknowledge the challenges that may arise in its implementation. Jackson and Davis (2000) emphasize the significance of positive relationships among all stakeholders involved in the education process. Establishing and maintaining these relationships require effective communication, trust, and a shared vision among co-teachers. However, Reeves (2003) argues that many teachers perceive collaboration as burdensome, citing time constraints, lack of administrative support, and conflicting instructional philosophies as barriers to effective collaboration. Therefore, it is crucial for schools to provide professional development opportunities that focus on developing collaboration skills, fostering a collaborative culture, and addressing the practical challenges that teachers may encounter.

To promote and sustain effective teacher collaboration, schools can benefit from adopting the Teacher Collaboration Improvement Framework proposed by Gajda and Koliba (2008). This framework provides a comprehensive guide for schools to administer, evaluate, and enhance collaboration practices. The first step involves raising collaboration literacy among teachers, helping them develop a deep understanding of the benefits and principles of collaboration. By establishing communities of practice, where teachers can engage in collaborative

problem-solving and knowledge sharing, schools can create a supportive environment for collaboration to thrive. Additionally, reconfiguring teacher teams and fostering interdisciplinary collaboration can enhance the exchange of ideas and diverse perspectives. It is essential for schools to assess the quality of collaboration regularly, identify areas for improvement, and make corrections accordingly. Recognizing and celebrating the accomplishments of co-teachers further reinforces the value and importance of collaboration in the school community.

While the present study focused on the impact of cooperative co-teaching on student achievement in mathematics instruction, it is crucial to explore the effects of collaboration across multiple subject areas. Different subjects may require varying levels and forms of collaboration, and investigating their impact can provide a more comprehensive understanding of the relationship between collaboration and student achievement. Moreover, longitudinal studies that assess the long-term effects of collaboration on student achievement are warranted to determine the sustainability and lasting benefits of collaboration in inclusive classrooms.

To advance the field of research on teacher collaboration and student achievement, it is imperative to address the limitations of the current study.

While the study utilized standardized assessments to measure the effect of collaboration on student performance in mathematics, future research should aim to incorporate a wider range of assessment measures to capture the full spectrum of student outcomes. This could include measures of cognitive skills, social-emotional development, and overall academic growth. By adopting a holistic approach to assessment, researchers can gain a more comprehensive understanding of the impact of cooperative co-teaching on student achievement in the inclusion classroom.

Another area of future research could focus on developing standardized definitions and measures for teacher collaboration. Currently, there is no universally accepted definition of collaboration, and different studies may employ different metrics to assess collaboration among teachers. Establishing a standardized framework for measuring collaboration would not only facilitate comparability across studies but also provide educators with clear guidelines and benchmarks for effective collaboration practices. This would enable schools to identify areas of strength and areas in need of improvement, leading to more targeted professional development and support for teachers.

Furthermore, future research should strive to utilize objective measures of teacher collaboration. While the Teacher Collaboration Assessment Survey

(TCAS) used in this study provides valuable insights, self-report measures are subject to biases and may not always accurately reflect the actual level of collaboration taking place. Incorporating observational measures or utilizing technology-based tools that capture real-time collaboration data could provide a more objective assessment of teacher collaboration and its impact on student achievement.

Additionally, the present study focused on the cooperative co-teaching relationship between special education and regular education teachers. While this collaboration is vital in inclusive classrooms, future research should also explore collaboration among teachers within the same specialty or subject area. Collaborative planning, lesson study, and professional learning communities among teachers of the same subject can enhance the quality of instruction and curriculum alignment, ultimately benefiting student achievement. By examining different forms of teacher collaboration, researchers can identify effective strategies that can be tailored to various educational contexts and subject areas.

Longitudinal studies that track student outcomes over an extended period are crucial for understanding the long-term effects of collaboration on student achievement. While the current study provides insights into the immediate impact of collaboration on student performance, examining the sustained effects

over multiple years can reveal the cumulative benefits and identify any potential challenges or fading effects. Longitudinal studies can also shed light on the factors that contribute to the longevity of the benefits, such as continued professional development, administrative support, and a collaborative school culture.

In closing, research on the relationship between teacher collaboration and student achievement in the context of special education and inclusive classrooms has shown promising results. Effective collaboration among co-teachers can enhance instructional practices, meet the individual needs of students, and promote positive learning outcomes. The findings of this study emphasize the importance of fostering collaboration in schools and provide evidence-based recommendations for improving collaboration practices in inclusive settings.

However, it is essential to acknowledge that collaboration is a complex process that requires ongoing support and effort from all stakeholders. Overcoming challenges such as time constraints, conflicting instructional philosophies, and limited resources will be crucial in promoting and sustaining effective collaboration. Schools can benefit from adopting the Teacher Collaboration Improvement Framework and implementing strategies to raise collaboration literacy, establish communities of practice, reconfigure teacher

teams, assess collaboration quality, make corrections, and recognize accomplishments.

Future research should aim to address the limitations of the current study by utilizing a broader range of assessment measures, developing standardized definitions and measures for collaboration, employing objective measures of collaboration, exploring collaboration within subject-specific contexts, conducting longitudinal studies, and assessing the impact of collaboration across multiple subject areas. By building upon the existing knowledge base, researchers and educators can work collaboratively to create inclusive educational environments that support the diverse needs of all students and promote positive learning outcomes.

Appendix A

Research Consent Form

Title of the Study: Inclusion Teacher Collaboration and Effects on Student Achievement

Principal Investigator: Katherine Derian, PhD Candidate: Katherine Derian

You are being invited to participate in a research study for a PhD dissertation. The purpose of this study is to investigate the effects of inclusion teacher collaboration on student achievement.

Procedure:

If you agree to participate, you will be asked to complete the survey during the mandatory professional development sessions. These sessions will take place during the winter month series, and make-up sessions will be provided if necessary. The study will involve collaborating with other inclusion math teachers to explore and implement strategies for inclusive instruction. Your participation in this study is voluntary, and you have the right to withdraw at any time without any penalty.

Confidentiality:

The data collected in this study will be treated with strict confidentiality. Your responses and any personal information you provide will be anonymized, and any identifying information will be removed from the analysis. Only the principal investigator and research team will have access to the data. Your identity will remain anonymous in any reports or publications that may result from this study.

Rights of Participants:

As a participant in this study, you have the following rights:

1. You have the right to withdraw from the study at any time without any penalty or consequences.
2. You have the right to refuse to answer any question that you do not wish to answer.
3. You have the right to ask questions or seek clarification about the study before, during, or after your participation.
4. By signing this consent form, you acknowledge that you have read and understood the information provided above, and you freely and voluntarily agree to participate in this research study.

If you have any questions or concerns regarding the study, you may contact the principal investigator, Katherine Derian, at katherine.derian@uniroma1.it. Additionally, if you have any concerns about your rights as a participant, you may contact the school administrator or testing proctor conducting the professional development sessions.

Please sign below to indicate your consent to participate in this research study:

Participant's Name (Printed)

Participant's Signature

Date

Principal Investigator's Name (Printed)

Principal Investigator's Signature

Date

Appendix B

Teacher Collaboration Assessment Survey (TCAS)

1. Dialogue

a. The purpose of our collaboration is to systematically improve instruction to increase student learning.

b. The membership configuration of my primary teacher team is appropriate – the right people are members of the group.

c. Team meetings are consistently attended by ALL members.

d. Agenda for team dialogue is pre-planned, written, and accessible to all in advance of meeting.

e. Team meetings are purposefully facilitated and employ the use of protocols to structure and guide dialogue.

f. A thoughtful, thorough and accurate account of team dialogue, decisions and intended actions is recorded.

g. Every member has access to running records of team dialogue, decisions and subsequent actions to be taken.

h. Inter-professional disagreements occur regularly – these disagreements are welcomed, openly addressed and lead to new shared understandings.

i. Team members participate equally in group dialogue; there are no "dominators" or "hibernators" in the group.

j. Our dialogue is consistently focused on examination of evidence related to performance and the attainment of goals.

k. The topic of the dialogue is focused on our instructional practices and not other issues (e.g., school schedules, textbook purchases, fund raising, discipline, students' family issues, chaperoning).

2. Decision making

a. My team regularly makes decisions about what instructional practices to initiate, maintain, develop, or discontinue.

b. All of our decisions are informed by group dialogue.

c. The process for making any decision is transparent and adhered to – everyone knows what the decisions are/were and how and why they were made.

d. The decisions we make are clearly and directly related to the improvement of instructional practice and the improvement of student learning.

e. The team uses a specific process for every decision it makes (e.g., consensus, majority or some other decision-making structure).

f. Team members regularly identify specific instructional practices that they will initiate or maintain to increase student learning.

g. Team members regularly identify strategies they will change or discontinue.

h. Our group regularly determines what information about instructional practice and student learning needs to be obtained.

3. Action

a. Each group member takes actions related to individual/team learning as a result of team decision making.

b. As a result of group decision making, each one of us makes meaningful (pedagogically complex) adjustments to our instructional practice.

c. Actions are directly related to student learning.

d. Each member knows what actions (related to learning) to take next at the end of the meeting.

e. Team member actions are coordinated and interdependent.

f. Each individual teacher employs specific instructional strategies that will increase student learning.

g. Each individual teacher discontinues less effective strategies.

h. Actions that are taken after or between meetings are distributed equitably among team members (i.e., every member takes steps to improve individual or team learning).

i. Each member can name some aspect of instruction that we have stopped/started or changed as a result of the group decision making.

j. Each member of the team commits to carrying out team actions.

4. Evaluation

a. As a group we regularly collect and analyze quantitative data (e.g., numbers, statistics, scores) about member teaching practices.

b. As a group we regularly collect and analyze qualitative data (e.g., open-ended responses, interviews, comments) about member teaching practices.

c. As a group we regularly collect and analyze quantitative data (e.g., numbers, statistics, scores) about student learning.

d. As a group we regularly collect and analyze qualitative data (e.g., numbers, statistics, scores) about student learning.

e. We observe the classroom instruction of our colleagues.

f. We collect information on the quality of the instruction during our observation.

g. We analyze data collected through peer observation of classroom instruction.

h. We use student performance data to evaluate the merit of our instructional practices.

i. We regularly share evaluation data on the effect of our instruction in our primary team.

j. The accomplishments of our team are publicly recognized.

k. Our team can accurately and thoroughly articulate and substantiate its accomplishment related to student learning over time.

Appendix C

Participating schools and population

WS/FCS Middle School	# of Inclusion practicing mathematics classroom	# of Students
Clemmons Middle	12	312
Southeast Middle	9	216
Flat Rock Middle	6	151
Walkertown Middle	9	243
Northwest Middle	12	303
Meadowlark Middle	9	210
East Forsyth Middle	9	224
Kernersville Middle	6	145
Mineral Springs	9	208
Wiley Magnet	12	318
Paisley IB	6	141

John F Kennedy Middle	6	136
Hanes Middle	12	310
Philo-Hill Magnet	9	219
Jefferson Middle	12	311
TOTAL: 15 schools	138 classrooms	3,447 pupils

Appendix D

Individualized Education Plan (IEP)

Individualized Education Program (IEP)

IEP Date:		**Purpose of IEP Meeting:** **Additional Purpose:**	
Student Name:	**UIC:**	**DOB:**	**Age:** years and month(s)
Gender:	**Resident District:**	**Attending District:**	
Attending School:	**Previous IEPT Date:**	**Grade:**	

Primary Language:		**Ethnicity:**	
Student's Address:	**City:**	**State:**	**Zip Code:**
County:		**Home Phone:**	**E-mail:**
Parent's Name:		**Relationship:**	
Language Spoken in the home:		**Interpreter Needed?:** ☐Yes ☐No	
Address (if different):	**City:**	**State:**	**Zip Code:**
Telephone:	**Telephone:**	**Telephone:**	**Email:**

IEP Team Participants in Attendance

Student is to be invited (if appropriate, but not later than age 16). A MET Evaluator is required at initial IEPs.

can explain the results of assessments.

☐ The Student:	☐ District Representative/Designee:
☐ Parent/Guardian:	☐ General Education Teacher:
☐ Parent/Guardian:	☐ Special Education Teacher:
☐ Other (with title):	☐ Agency Providing Transition Services (Age 16+):
☐ Other (with title):	☐ Other (with title):
☐ Other (with title):	☐ Other (with title):

Parent & District Agreement on Attendance Not Necessary: these members are absent because their curricular area/related services are not being modified or discussed in the meeting:

Parent & District Agreement on Excusal Prior to Meeting: these members are absent but have submitted their written input to parent & IEP Team for IEP development prior to the meeting:

Eligibility for Special Education and Qualifying Criteria

The student is: ☐Eligible ☐Not Eligible (Commitment/Notice Section must be completed)

Primary Eligibility

Student Name: **IEP Date:**

Student Summary
Describe the student's **strengths**: .
Describe the **parent concerns** for enhancing student's education: .
Describe the student's **developmental and functional needs**: .
Describe the student's **progress toward current IEP annual goals** and objectives (Omit at initial IEPT meeting): .
Describe the student's **progress in the general education classroom,** including **success of agreed-upon modifications** and student/teacher supports: .
Describe the student's **anticipated needs** of other matters: (e.g. high school credits, cohort group, curriculum planning, etc.): .

Student Name: **IEP Date:**

Present Level of Academic Achievement and Functional Performance (PLAAFP)			
Area or Domain	**Sub-Area**	**Present Performance Levels/Strengths** **Include recent assessment data. Explain how data establishes a beginning instruction point.**	**Describe how the student's disability affects the student's involvement and progress in the general education curriculum. For preschool children, as appropriate, how the disability affects the child's or student's involvement in age-appropriate activity.**
Reading		.	.
Writing		.	.
Mathematics		.	.
Communication: Speech & Language		.	.
Socio-Emotional/Behavioral		.	.
Perception/Motor/Mobility		.	.
Medical/Health/Physical		.	.
Adaptive/Independent Living		.	.
Transition (age 16+)		.	.
Cognitive		.	.

Student Name: **IEP Date:**

Consideration of Special Factors		
a)	**Does . have behavior which impedes his learning or the learning of others?**	☐Yes ☐No
b)	**Does . have limited English proficiency?**	☐Yes ☐No
c)	**Does . have blindness or visual impairment?**	☐Yes ☐No
d)	**Did you consider .'s communication needs?**	☐Yes ☐No
	Is . deaf or hard of hearing?	☐Yes ☐No
e)	**The IEP Team has considered whether . needs Assistive Technology devices and services in order to progress toward his goals and objectives and determined that:**	
	1. ☐ Assistive Technology is necessary. 2. ☐ It has not yet been determined whether . needs AT in order to progress toward his IEP goals and objectives. The Team plans to make this decision in the following way: 3. ☐ Assistive Technology is not necessary at this time.	
f)	**Does . have health, physical, and/or medical issues that may impact learning?**	☐Yes ☐No
g)	**Does . have any perceptual, motor, or mobility concerns, such as gross and fine motor coordination, balance, and limb/body mobility that impedes learning.**	☐Yes ☐No

Student Name: **IEP Date:**

Supplementary Aids and Supports

Supports and Modifications to the Environment, Behavior Training Needs, Social Interaction Supports for the Student, Health-Related Needs, Physical Needs, Transitioning Times, Assistive Technology, Training Needs, Guidance.

Area	Aids or Supports	Frequency/Conditions Circumstances	Location/Setting	Start Date (if different from IEP)	End Date (if different from IEP)
.	.	.	.		

Student Name: **IEP Date:**

Personal Care Services

Does the student have a chronic condition(s) that requires **Personal Care Services** (identified below) to enable him to accomplish Activities of Daily Living (ADL) in the area(s) checked here: ☑ Yes ☐ No

		Time, Frequency, Conditions, Circumstances	Location/Setting
☑	Eating/Feeding/Meal Preparation		
☑	Respiratory Assistance		
☑	Toileting/Maintenance Continence		
☑	Mobility/Positioning, Ambulation, Transferring		
☑	Bathing/Dressing/Grooming/Skin-Care/Personal Hygiene		
☑	Assistance with Self-Administered Medications		
☑	Redirection & Intervention for Behavior		
☑	Health-Related Functions (via hands-on Assistance, Supervision, Cueing)		
☑	Intervention for Seizure Disorder		

Student Name: . IEP Date:

Annual Goals

Area Of Need:

Content Expectations On Which This Goal Will Be Based::

Baseline Data:

Annual Goal:

Short-Term Objective:

Position(s) Responsible for Implementing these Goal Activities:

Performance Criteria:	Evaluation Procedures or Methods:	Schedule of Evaluation:

Reporting on Progress:

☐ Option A - Progress Reporting (Graph) ☐ Option B - Progress Reporting (Text)

Student Name: **IEP Date:**

Programs and Services

Related Services with General Education and/or Special Education Programs
Direct Service: the primary mode of service is directly working with the student. There may be occasional consultation with others.
Consultative Service: the primary mode of service is working with the teacher(s) and others having daily contact with the student. Direct work with the student is occasional

Current IEP Year: From Date School Year: Grade:	**To Date:** School Year: Grade:

Related Services	Start Date (if different from IEP)	End Date (if different from IEP)	Service Mode	Minutes		Sessions		Frequency	Setting within Location
				Low Min.	High Min.	Low Number	High Number		
			☐ Direct ☐ Consultative	0	0	0	0		

Programs	Departmentalized	Start Date	End Date	LRE/FTE Calculation Area					Bldg/Location
				SE Setting		GE Setting		Total	
				Low Min/Wk	High Min/Wk	Low Min/Wk	High Min/Wk	Min/Wk	
	☐Y ☐N			0	0	0	0	0	
				SE FTE: 0		GE FTE: 0		Total FTE: 0	FTE as of 02/09/2011

Does the student require a reduced schedule? ☐Yes ☐No

Does the student receive Specialized Transportation? ☐Yes ☐No

Is there a need for placement with a teacher with an endorsement in a particular impairment category? ☐Yes ☐No

Is a Teacher Consultant with endorsement in the student's impairment needed to support the resource program teacher? ☐Yes ☐No

Extended School Year Services (ESY)
☐ **Extended School Year Services were considered.** **Recommendation:** ☐ **The IEP Team determined that ESY services <u>are not needed</u>** ☐ **Based upon a review of data on one or more current annual goals, the IEP Team determined that ESY services <u>are needed</u>**

Student Name: **IEP Date:**

Assessment - Participation and Provisions

If IEP team determines that student must take MI-Access instead of a particular MEAP assessment, indicate why the student cannot participate in MEAP assessment; and why a particular MI-Access assessment (or alternate Social Studies Assessment) is appropriate.

The IEP Team has determined the following State and/or District Assessments will be administered:

Test	Subtest	Test Type	Timing/Scheduling	Setting	Presentation	Response
MEAP (Gr 3-9)						
MI-Access (Gr 3-8,11)						
ACT (Gr 11 -12)						
MME (Gr 11-12)						

Complete this if the student is age 14 or older. Required for Grade 11 High School ACT-MME:				
As appropriate, mark **ALL** school years for which the student has had an IEP or 504 Plan, including year(s) before high school:				
Below Grade 8 ☐	Grade 8 **School Year** (YY-YY)	Grade 9 **School Year** (YY-YY)	Grade 10 **School Year** (YY-YY)	Grade 11 **School Year** (YY-YY)

Student Name: IEP Date:

Other Considerations

Student Name: **IEP Date:**

Transition Activities/Services
Describe how the student's course of study aligns with the postsecondary vision:
Check Only One: ☐ Merit Curriculum leading to a high school diploma ☐ Course of Study leading to:
Is . expected to graduate with a Regular Diploma during this IEP year? ☐ Yes ☐ No
Will . complete age eligibility for Special Education services? ☐ Yes ☐ No
Was there a need to invite a community agency representative likely to provide current or future services? ☐ Yes ☐ No Please list any additional steps taken to ensure that the student has made connections with any appropriate outside programs and services:

Transition Consideration
Parental Rights and Age of Majority

Student's Post-Secondary Vision
Transition Assessments:
Has an Educational Development Plan been created? ☐ Yes ☐ No
Will a Student Transition Visions survey be completed? ☐ Yes ☐ No
If student did not attend IEP, describe steps taken to ensure consideration of student's preferences/vision:
Adult Living: As an adult, where do you want to live?
Community Participation: As an adult, what hobbies and activities do you want to do in your community? (arts, recreational activities, shopping, eating out, etc.)
Post Secondary Education/Training: After high school, what additional education and training do you want?

Transition Activities and Services - Required by Age 16		
Needed Transition Activities/Services Related to Student's Postsecondary Vision and Present Level of Academic Achievement and Functional Performance:	**Responsible Agency/Persons**	**Expected Completion Date**
Is there a need for activities or services for the Instructional Area? ☐ Yes ☐ No		
Is there a need for activities or services in the area of Community Experiences? ☐ Yes ☐ No		
Is there a need for activities or services in the Development of Employment? ☐ Yes ☐ No		
Is there a need for Other Post-School Adult Living activities or services? ☐ Yes ☐ No		
When appropriate, is there a need for activities or services in the Acquisition of Daily Living Skills? ☐ Yes ☐ No		
When appropriate, is there a need for a Functional Vocational Evaluation? ☐ Yes ☐ No		

IEP Date:

Student Name: **IEP Completion Date:**

Commitment Signatures

Resident District - Resident District superintendent/designee (check all that apply):

____ Agrees with the IEP and its implementation ____ Disagrees with this IEP **and:** requests mediation. *(see bottom of page*)*

____ *Authorizes the nonresident operating district to* conduct subsequent IEP meetings.

____ Agrees that the student is not eligible for special education

Position responsible: Initial implementation site:

Signature: _____
(Resident District Superintendent or Designee)

Non-resident Operating District – The superintendent/designee:

____ Agrees to provide the IEP program(s) and/or service (s). ____ Disagrees with this IEP **and:** requests mediation.

____ Agrees to conduct subsequent IEP meetings.

____ Agrees that the student is not eligible for special education.

Position responsible: Initial implementation site:

Signature:

_____
(Operating District Superintendent or Designee)

Notice Requirements:

The superintendent or designee of the operating district ensures that:

a) to the maximum extent appropriate, a person who has a disability, including a person who is assigned to a public or private institution or other care facility, is educated with persons who do not have disabilities.

b) placement of a person who has a disability in special classes, separate schools, or the removal of a person who has a disability from the general education environment occurs only when the nature or severity of the disability is such that education in a regular class using supplementary aids and services cannot be satisfactorily achieved.

c) the placement for the student is as close as possible to his or her home.

d) unless the IEP of a student with a disability requires some other arrangement, the student is educated in the school that he or she would attend if non-disabled.

e) in selecting the least restrictive environment, consideration shall be given to any potentially harmful effects to the student or the quality of services that the student needs.

f) a student with a disability will not be removed from education in age-appropriate regular classrooms solely because of needed modifications in the general education curriculum.

Consent being provided by:

I have been informed of all procedural safeguards and sources to obtain assistance:

____ Understands the contents of this IEP. ____Disagrees, but will allow implementation of this IEP.

____Agrees with the IEP and its implementation. ____Disagrees with this IEP **and:** requests mediation.

____Agrees that the student is not eligible for special education.

_____ _____
Signature of Parent/Guardian Date

Student Signature - Optional for students under the Age of Majority (18)

_____ _____
Signature here shows student desires to work with this plan Date

Dissenting Opinion

Any IEP team member who disagrees with this IEP may attach a dissenting report.

Parent/Guardian/Adult Student Consent For Medicaid School Based Services Program

Student Name:	Date of Birth:	UIC:
IEP Meeting Date:		

☐ Consent obtained at meeting
☐ Consent was not obtained at the meeting

_____

Parent/Guardian/Adult Student Signature and Date

School Name

Teacher Name

Form

8 13

A

NORTH CAROLINA
TESTING PROGRAM

End-of-Grade Mathematics Test – Grade 7
2019–20

SIDE 1

TO BE COMPLETED BY THE TEST ADMINISTRATOR OR PRINCIPAL'S DESIGNEE AFTER TESTING

1. Mark any of the following that apply to this student.
   - ◯ Student Identified Only Under Section 504
   - ◯ Student Identified with a Transitory Impairment
2. Which, if any, of the following accommodations were provided to this student for math during this test administration? (Mark all that apply.)
   - ◯ Braille Edition
   - ◯ Large Print Edition
   - ◯ Assistive Tech. Devices
   - ◯ Cranmer Abacus
   - ◯ Dictation to a Scribe
   - ◯ Magnification Devices
   - ◯ Testing in a Separate Room
   - ◯ Scheduled Extended Time
   - ◯ One Test Item Per Page Edition
   - ◯ Multiple Testing Sessions
   - ◯ Student Reads Test Aloud to Self
   - ◯ Student Marks Answers in Test Book
   - ◯ Word-to-Word Bilingual (English/Native Language) Dictionary/Electronic Translator
   - ◯ Interpreter/Transliterator Signs/Cues Test
   - ◯ Test Read Aloud (in English)
   - ◯ Braille Writer/Slate & Stylus (Braille Paper)
   - ◯ Special NCDPI-Approved Accommodation

PowerSchool Student Number

Student's Last Name | **First Name**

◯ **ABSENT FROM MAKEUP**

SAMPLES

S1 Ⓐ Ⓑ Ⓒ Ⓓ

S2 | S3

SPECIAL CODES

A B C D E F

G H I J K L

Serial #

DO NOT WRITE IN THIS SHADED AREA

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Appendix E Math EOG Score Sheet

Appendix F

North Carolina End-of-Grade Mathematics Test Specifications

End-of-Grade Mathematics Tests at Grades 3–8
North Carolina Test Specifications

Purpose of the Tests

- The Grades 3–8 End-of-Grade (EOG) Mathematics Tests measure students' proficiency on the *NC Standard Course of Study* (NC*SCOS*) for Mathematics, adopted by the North Carolina State Board of Education in June 2017.
- Test results will be used for school and district accountability under the accountability model and for federal reporting purposes.

Curriculum Cycle

- June 2017: The North Carolina State Board of Education adopted the NC*SCOS* for Mathematics.
- 2017–2018: Items developed and field-tested for the EOG Mathematics Tests
- 2018–2019: First operational administration of EOG Mathematics Tests (Edition 5)

Standards

- The eight Standards for Mathematical Practice help develop processes and proficiencies in students such as problem solving, reasoning, proof, communication, representations, and connections as well as conceptual understanding and procedural fluency. Test items that are developed for content standards may link to one or more of the Standards for Mathematical Practice.

Developing Tests

- North Carolina educators were recruited and trained to write new items. The diversity among the item writers and their knowledge of the current standards was addressed during recruitment. Trained North Carolina educators also review items and suggest improvements, if necessary. The use of North Carolina educators to develop and review items strengthens the content validity of the items.
- For an in-depth explanation of the test development process see North Carolina State Board Policy Multiple-Choice Test Development (TEST-013) or reference the Test Development Process: Item, Selection, and Form Development document.

Prioritization of Standards

- Members of the North Carolina Department of Public Instruction (NCDPI)/Test Development Section invited North Carolina educators to collaborate and develop recommendations for a prioritization of standards indicating the relative importance of each standard, the anticipated instructional time, and the appropriateness of the standard for test design.
- Subsequently, Standards, Curriculum and Instruction and test development staff from the NCDPI met to review the recommendations from the teacher panels and to adopt final weight distributions across the domains for each grade level.
- Some content standards in the NC*SCOS* for Mathematics, will not be directly assessed in

the tests because either (1) the standard cannot be appropriately assessed during a limited time test using multiple-choice and/or gridded-response items or (2) the standard is better assessed through another, more inclusive standard.

- *Tables 1*, *2*, and *3* describe the range of total items by conceptual category and Depth of Knowledge (DOK) that will appear on the End-of-Grade Mathematics Tests.

Table 1: Weight Distributions for EOG Mathematics Grades 3–5

Domain	Grade 3	Grade 4	Grade 5
Operations and Algebraic Thinking	32–36%	14–18%	9–13%
Number and Operations in Base Ten	9–13%	25–29%	25–29%
Number and Operations - Fractions	28–32%	30–34%	39–43%
Measurement and Data, Geometry	23–27%	23–27%	19–23%
Total	**100%**	**100%**	**100%**

Table 2: Weight Distributions for EOG Mathematics Grades 6–8

Domain	Grade 6	Grade 7	Grade 8
Ratios and Proportional Relationships	24–28%	24–28%	—
The Number System	20–24%	8–12%	—
Expressions and Equations	22–26%	20–24%	—
The Number System, Expressions and Equations	—	—	24–28%
Functions	—	—	28–32%
Geometry	12–16%	16–20%	24–28%
Statistics and Probability	12–16%	22–26%	16–20%
Total	**100%**	**100%**	**100%**

Table 3: EOG Math 3–8 Item by DOK Distribution

Grades	DOK1	DOK2	DOK3
3	40–50%	50–60%	—
4	35–45%	50–60%	5%
5	30–40%	50–60%	8–10%
6	25–35%	50–60%	8–15%
7	25–35%	50–60%	8–15%
8	25–35%	50–60%	8–15%

Cognitive Rigor and Item Complexity

- Test items will be designed, developed, and classified to ensure that the cognitive rigor of the operational test forms align to the cognitive complexity and demands of Webb's Depth of Knowledge and the NC*SCOS* for Mathematics. These items will require students to not only recall information, but also apply concepts and skills and make decisions.

Test Structure and Administration Time

- *Table 4* provides the number of operational items and field test items. Embedded field test items will not be included in the score but will be used for purposes of developing items for future test forms.

Table 4: EOG Mathematics Total Number of Items

Grade	3	4	5	6	7	8
Operational Items	40	40	40	45	45	45
Field Test Items	6	6	8	8	8	8
Total Items	**46**	**46**	**48**	**53**	**53**	**53**

- The grades 3 and 4 mathematics tests will include both calculator inactive and calculator active sections. The tests will consist of four-response-option multiple-choice items. Multiple-choice items will be worth one point each.
- The grades 5–8 mathematics tests will include both calculator inactive and calculator active sections. Both sections will have multiple-choice and gridded response/numeric entry item types. All items will be worth one point each.

Table 5: EOG Mathematics Calculator Active/Inactive Operational Items

Grade	3	4	5	6	7	8
Calculator Inactive Operational Items	20	20	20	15	15	15
Calculator Active Operational Items	20	20	20	30	30	30

- Based on analysis from item completion timing data, the NCDPI estimates it will take 120 minutes for most students to complete the EOG tests. The NCDPI requires all students be allowed ample opportunity to complete the test. The maximum amount of time allowed is 180 minutes except for students with documented special needs requiring accommodations, such as *Scheduled Extended Time*. Refer to the *North Carolina Test Coordinators' Policies and Procedures Handbook* for additional information.

Supplemental Materials

- Students in grades 3–5 must be provided any four-function calculator with memory key. Students in grade 6–8 must be provided any four-function calculator with a square root function, y, x, π (pi), and algebraic logic. The online version of these tests has an online calculator option. Students may practice using this online calculator at:
  - Grades 3–4: Four-Function Calculator (www.desmos.com/testing/northcarolina/fourfunction)
  - Grades 5–7: Scientific Calculator (www.desmos.com/testing/northcarolina/scientific)
  - Grade 8: Scientific or Graphing Calculator (www.desmos.com/testing/northcarolina/scientific), (www.desmos.com/testing/northcarolina/graphing)
  - Refer to the *North Carolina Testing Program Calculator Requirements Assessment Brief* for additional information,
- All students must be provided graph paper and blank paper.
- Schools must ensure every student participating in an online test for the North Carolina Testing Program completes the Online Assessment Tutorial for the associated test at least once at the school before test day. The tutorial provides students the opportunity to practice the mechanics of navigating through the testing platform, to become familiar with the tools, and to respond to the sample items. Refer to the *North Carolina Test Coordinators' Policies and Procedures Handbook* for additional information.

- Released forms are available on the EOG webpage and through NCTest, the NCDPI's online testing platform. The released form is built using the same operational test specifications. A single release form may not reflect the full depth and breadth of grade level assessed standards, but it reflects the range of difficulty found on any operational test form.
    - Released items may be used by Public School Units to acquaint students with items. These materials must not be used for personal or financial gain.

Test Cycle and Delivery Mode

- The EOG tests must be administered during the last ten (10) days of the school year. All students in membership at grades 3–8 (according to PowerSchool) are expected to participate with or without accommodations in the standard administration of the EOG tests.
- The Grades 3–8 EOG Mathematics Tests are designed for online administrations. Paper/pencil versions of all online tests, including required online administrations, are available for technology hardship situations and for students with disabilities who need to test in the paper mode for accessibility.
- The EOG tests are only provided in English. Native language translation versions are not available. North Carolina G.S.§115C-81.45(a) requires all teachers and principals to conduct classes except foreign language classes in English.

Additional Resources

- Achievement level information is available on the EOG webpage.
- Sample Individual Student Reports are available on the NCDPI Individual Student Reports (ISR) webpage.

Appendix G

WSFCS EOG Testing Calendar

WS/FCS Testing Calendar

2021 - 2022 School Year - Spring Semester

Assessment	WS/FCS Contact	Students Testing	Testing Window
WIDA Screener	Newcomers Center	Newly enrolling students in Grades 1 – 12 with a language other than English indicated on Home Language Survey	Within of 30 days of enrollment
ACCESS for ELLs 2.0®	Testing Department and ESL Department	All EL Students	January 24 - March 11, 2022
Alternate ACCESS for ELLs®	Testing Department and ESL Department	All EL Students on Extended Content Standards	
Biology Check-In 1: Structures and Functions of Living Organisms	Testing Office	Students enrolled in second semester block Biology	February 10 - 11, 2022 [Early and Middle Colleges: January 25 - 26, 2022]
CDM Phase 1 Assessments (Spring 2021)	Advanced Learning, Testing Office, and Teaching and Learning	Students requesting testing to earn credit by demonstrated mastery (high school courses only)	February 15 - 25, 2022
ACT® without Writing	Testing Office	All Grade 11 students	**Window 1 (Primary Test Date):** March 1, 2022 **Window 2 (Makeup Date):** March 15, 2022 **Window 3 (Emergency Use Only):** March 29, 2022
ACT® Accommodations Testing Window	Testing Office	All Grade 11 students with accommodations	**Window 1 (Primary):** March 1 - 11, 2022 **Window 2 (Makeup):** March 15 - 25, 2022 **Window 3 (Emergency Use)**: March 29 - April 7, 2022
College and Career Readiness Alternate Assessment at Grade 11	Testing Office	Grade 11 OCS	
NCEXTEND1 Alternate Assessment—Grade 11	Testing Office	Grade 11 Extended Content Standards	
Biology Check-In 2: Molecular Biology	Testing Office	Students enrolled in second semester block Biology	March 2 - 3, 2022 [Early and Middle Colleges: February 8 - 9, 2022]
HS Local Benchmarks (Second Semester Block, Assessment 1; Yearlong, Assessment 2)	Testing Office and Teaching and Learning - Core	Students enrolled in English II and NC Math 3	March 7 - 11, 2022 [Early and Middle Colleges: February 21 - 25, 2022]
NC Check In, Interim 3	Testing Office	Grades 3 – 8: Mathematics Grades 4 – 8: Reading Grade 5 Science (Physical) Grade 8 Science (Earth)	March 15 - 24, 2022

WS/FCS Testing Calendar

2021 - 2022 School Year - Spring Semester

Assessment	WS/FCS Contact	Students Testing	Testing Window
NC Math 1 Check-In 1 (Second Semester Block)	Testing Office	Students enrolled in NC Math 1	March 18 - 24, 2022 [Early and Middle Colleges: February 28 - March 4, 2022]
ACT® WorkKeys—Standard and Accommodated Administrations	Testing Department and CTE Department	Grade 12 CTE completers who did not test during the fall window	March 29, 2022 Makeups and accommodated testing through April 8, 2022
NC Math 1 Check-In 2 (Yearlong)	Testing Office	Students enrolled in NC Math 1	April 4 - 8, 2022
HS Local Benchmarks (Second Semester Block, Assessment 2)	Testing Office and Teaching and Learning - Core	Students enrolled in English II and NC Math 3	April 25 - 29, 2022 [Early and Middle Colleges: April 19 - 25, 2022]
Biology Check-In 3: Evolution and Genetics	Testing Office	Students enrolled in second semester block Biology	April 28 - 29, 2022 [Early and Middle Colleges: March 30 - 31, 2022]
International Baccalaureate Assessments	Advanced Learning	Students enrolled in IB courses	April 28 - May 20, 2022
Advanced Placement Tests	Advanced Learning	Students enrolled in AP courses	May 2 - 13, 2022
i-Ready EOY Benchmark	Testing Office and Teaching and Learning - Core	Grades K – 8 Reading and Math	K-8 Reading: May 2 - 13, 2022 K-8 Math: May 9 - 20, 2022
mCLASS/DIBELS	Testing Office and Teaching and Learning - Core	K - 3 Reading	May 4 - 25, 2022
Biology Check-In 4: Ecosystems	Testing Office	Students enrolled in second semester block Biology	May 19 - 20, 2022 [Early and Middle Colleges: April 21 - 22]
NC Math 1 Check-In 2 (Second Semester Block)	Testing Office	Students enrolled inNC Math 1 (Second semester block)	May 19 - 23, 2022 [Early and Middle Colleges: April 25 - April 29, 2022]
NCEXTEND1 Alternate Assessment—Grades 3–8 Math and Reading, Grades 5 and 8 Science	Testing Office	Grades 3 – 8 Extended Content Standards	May 26 - June 9, 2022 (Final 10 instructional days of the school year)
NCEXTEND1 Alternate Assessment—Biology, English II, and Math I	Testing Office	Grade 10 Extended Content Standards	
End-of-Course (EOC) Assessments—Biology, English II, NC Math 1, and NC Math 3	Testing Office	All students enrolled in second semester block EOC course or yearlong EOC course.	Elementary, Middle, and Yearlong High

WS/FCS Testing Calendar

2021 - 2022 School Year - Spring Semester

Assessment	WS/FCS Contact	Students Testing	Testing Window
End-of-Grade (EOG) Assessments—Grades 3–8 Math and Reading, Grades 5 and 8 Science	Testing Office	All students in Grades 3 - 8	School courses: May 26 - June 9, 2022 (Final 10 instructional days of the school year) High School Block/Semester courses: June 3 - 9, 2022 (Final 5 instructional days of the semester) [Early and Middle Colleges: May 18 - 24, 2022]
MS and HS Local Final Exams	Instructional Services	World Languages, Grades 8 - 12	
HS CTE Post-Assessments	CTE Department	High School students enrolled in second semester block CTE courses.	
Read to Achieve Test—Grade 3	Testing Office	Grade 3 students who did not achieve proficiency on ELA EOG and did not have GCE.	May 26 - June 9, 2022 (Final 10 instructional days of the school year)
Grade 3 End-of-Grade (EOG) Reading Retest	Testing Office	Grade 3 students who did not achieve proficiency on ELA EOG and Read to Achieve and did not have GCE.	May 26 - June 9, 2022 (Final 10 instructional days of the school year)
K - 2 Math End of Year Assessment (DPI)	Math Department	K - 2 Math	May 26 - June 9, 2022
EOC & EOG Summer Readministration	Testing Office	Students who did not achieve proficiency on EOG and EOC and attended remediation sessions	TBA
CDM Phase 1 Assessments (Summer 2022)	Advanced Learning, Testing Office, and Teaching and Learning	Students requesting testing to earn credit by demonstrated mastery (high school courses only)	July 18 - 28, 2022

9/9/2021

Appendix H Testing Accommodation form

Review of Accommodations Used During Testing

Student Name	
PowerSchool ID	
Case Manager	
Choose one of the following plans (according to order of accommodations documentation).	□ IEP □ Section 504 Plan □ EL Plan □ Transitory Impairment Documentation
Dates of Plan	Start Date:
	End Date:
Test	□ BOG3 □ EOG □ EOC □ CCRAA □ CTE □ ACCESS for ELLs □ Alternate ACCESS for ELLs
Subject/Subtest	

Complete one form per test. Before testing, complete the top of the form and Column 1. During/after testing, complete Column 2. Completed forms should be kept in the student's Individualized Education Program (IEP) folder and/or Section 504/English Learner (EL)/transitory impairment documentation to be accessible for future reference. While the list below includes all state-approved accommodations, some do not apply to students identified solely as ELs. Testing accommodations should be consistent with the accommodations used routinely during classroom instruction and on similar classroom assessments.

□ Regular Administration □ Other Administration

School	
Grade	
Test Date	
Test Administrator	

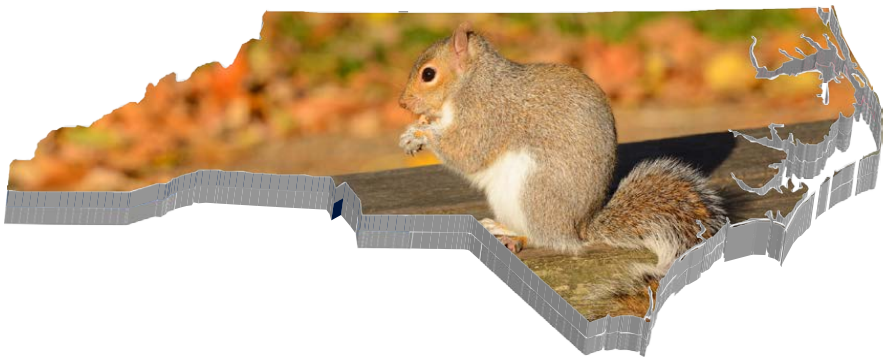
	Column 1: To Be Completed before Testing	Column 2: To Be Completed during/after Testing	
	Check the required accommodations documented on the student's IEP/Section 504 Plan/EL Plan/Transitory Impairment Documentation.	Was this accommodation ***provided*** to the student during testing?	Describe the specific details of ***how*** this accommodation was provided to the student. Did the student ***use*** the accommodation? If yes, ***how*** did he/she use it?
□	Assistive Technology Specify:		
□	Braille Edition Specify:		
□	Braille Writer/Braille Paper		
□	Cranmer Abacus		
□	Dictation to a Scribe		
□	Electronic Braille Notetaker		
□	Interpreter/Transliterator Signs/Cues Test		
□	Large Print Edition		
□	Magnification Devices		
□	Multiple Testing Sessions Specify:		
□	One Test Item Per Page Edition		
□	Scheduled Extended Time Specify:		
□	Slate and Stylus/Braille Paper		
□	Student Marks Answers in Test Book		
□	Student Reads Test Aloud to Self		
□	Test Read Aloud (In English) Specify:		
□	Testing in a Separate Room Specify:		
□	Special NCDPI-Approved Accommodation(s) Specify:		
□	Word-to-Word Bilingual (English/Native Language) Dictionary/Electronic Translator (EL only)		

Printed name of person completing this portion of the form:	Printed name of person completing this portion of the form:
Signature of person completing this portion of the form:	Signature of person completing this portion of the form:

Comments/considerations for next IEP/Section 504/EL/Transitory Impairment team meeting:

Appendix I
NC Testing Security Protocols

TESTING SECURITY Protocol and Procedures for School Personnel



2022–23

North Carolina Department of
PUBLIC INSTRUCTION

Stock No. 23781

The Testing Security Protocol and Procedures for School Personnel Publication

General Statute §115C-174.10 states that the Annual Testing Program has three purposes: "(i) to assure that all high school graduates possess those minimum skills and that knowledge thought necessary to function as a member of society; (ii) to provide a means of identifying strengths and weaknesses in the education process in order to improve instructional delivery; and (iii) to establish additional means for making the education system at the state, local, and school levels accountable to the public for results." In order to maintain the integrity of the Annual Testing Program, it is essential for school personnel to develop awareness of proper testing protocol and procedures. Knowledge of testing policies and procedures helps ensure the Annual Testing Program is conducted in a manner that is fair, consistent, and equitable for all students.

The *Testing Security Protocol and Procedures for School Personnel* publication is provided to principals, teachers, and other school personnel as a reference for implementing secure, uniform test administrations in North Carolina schools. This testing security publication should be kept in schools, and additional copies may be downloaded from the North Carolina Department of Public Instruction's (NCDPI) website at https://www.dpi.nc.gov/districts-schools/testing-and-schoolaccountability/testing-policy-and-operations/testing-security.

Secure Testing Practices

Test Security

Secure test materials include, but are not limited to, blueprints; test layout forms; item pools; operational and field test books, test questions, or test book sections; and answer documents. Secure test materials may be in either electronic or paper format. North Carolina test materials are often reused and are costly to generate; every precaution must be taken to ensure all test materials remain secure at all times.

Secure state tests must not be copied, reproduced, paraphrased, filed, or used directly in instructional activities. School personnel and proctors must not disclose the contents of secure tests, nor discuss with each other or with students any specific test questions or information contained in the tests or write about the questions on the internet or on social media sites. This prohibition includes teachers serving on item writer or test reviewer committees. Discussing information related to the content of specific test questions or test forms is prohibited and a direct violation of the *Testing Code of Ethics*. Anyone involved in the testing process is expected to adhere to this guideline. In doing so, the integrity of tests is maintained, which helps minimize the use of costly resources when test security has been compromised.

Excerpts from secure tests must not be used at any time during classroom instruction or in resource materials such as study guides. Access to the tests shall be limited to school personnel who have a legitimate need. Persons who have access to secure test materials must not use their access for personal gain.

Testing Code of Ethics

The *Testing Code of Ethics* (16 N.C. Admin. Code 06D .0311) stresses the importance of maintaining test security at all times and addresses appropriate professional practices for central office staff, school administrators, test coordinators, teachers (test administrators), and proctors in the areas of securing tests; administering tests; and scoring, reporting, and interpreting test results.

Ethical testing practices include the following:

- informing students about the tests and why the tests are important;
- informing students and parents about how the tests and test results will be used;
- preparing students to take the tests;
- ensuring all eligible students take the tests;
- encouraging students to attempt to respond to all test questions and

do their best; and
- sharing the results of the tests (along with any available interpretation of the scores) with students and parents within the allotted timelines.

A copy of the *Testing Code of Ethics* is located in Appendix A of this publication and is also printed in all North Carolina test administration guides. Before each test administration, test administrators and proctors must read and review thoroughly the *Testing Code of Ethics* and its sanctions, paying careful attention to section (k)—the unethical testing practices cited in the *Code*—and section (l)—the sanctions for violations of the Code. This document has the effect of law in North Carolina. Following the *Testing Code of Ethics* helps ensure testing is conducted in a fair and ethical manner in every classroom across the state. The *Testing Code of Ethics* is part of Title 16 of the Administrative Code and must not be removed from this document. A copy may be requested from the public school unit (PSU) test coordinator for reference.

Use of Secure State Tests
According to 16 N.C. Admin. Code 06D .0310, "Secure tests as defined in N.C. Admin. Code 06D .0307(b) of this Section developed by the State of North Carolina as part of the Annual Testing Program shall not be used for purposes other than to measure reading proficiency at the beginning of grade three, end-of-grade progress for grades three through eight, end-of-course competencies, and competencies in English, mathematics, reading, and science at the end of grade 11 as tested in the ACT, and competencies in mathematics, reading, and information location at the end grade 12 as tested in ACT WorkKeys."

Internet Security, Security of Test Materials, and Online Content
PSUs are required to use a secure platform to access online, state-mandated tests. It is imperative that PSU testing and technology staff work closely together to prepare devices appropriately for online tests.

Online tests contain secure test data, copyrighted content, and confidential student records. Therefore, test administrators, proctors, technology staff, and students must follow rules and procedures that ensure online content is not available to anyone for any other purpose than to conduct the test administrations. Users must not access a test and then leave the device unsupervised. Locally stored off-line content (e.g., cookies, cache) must be cleared or secured after accessing the test so that users cannot launch malicious applications or gain access to secure test materials.

Schools must meet specific technical requirements. Schools should review these technical requirements on days before an online test administration

and must make any necessary adjustments before administering the test. Schools that administer an online test, but do not meet the technical requirements, are at risk of providing students questions that cannot be manipulated (e.g., technology-enhanced items), questions without associated artwork (e.g., tables, graphs, symbols), and questions that do not display properly on the screen. Many technical issues can be resolved locally by ensuring that students are using acceptable hardware, necessary adjustments are made to the local network, all required applications are loaded and meet necessary version requirements, and a minimum screen resolution is set.

Schools permitting the use of devices not owned or leased by the PSU for state online tests must have a plan in place that addresses security concerns, including the ability and permission to (1) monitor device use, (2) install and uninstall programs or apps for testing and security monitoring, and (3) secure the devices for close inspection before and after testing, as needed. Additionally, PSUs must have acceptable usage policies that include detailed provisions addressing state online testing security and student consequences for security violations.

Best practices for password protection include, but are not limited to, the following:

- Never share passwords with anyone. User accounts are confidential.
- If passwords must be written down on a piece of paper, store the paper in a secure place and destroy it when it is no longer needed.
- Change passwords immediately if they have been compromised.
- Do not save or allow devices to autofill secure passwords. Selecting this option poses a security threat.

Test Preparation

Released Test Questions

The Annual Testing Program has made available released test forms for all state-mandated tests. Released test forms reflect the currently adopted content standards. Released tests that are aligned to previously adopted standards are retired and are no longer publicly available. The released test forms aligned to current standards can be found by searching for the type of test and resource at https://www.dpi.nc.gov/testing-documents.

To navigate this site,

- click the "Type of State Test" dropdown box to select a test type,
- click the "Resource" dropdown box and select "Released Tests," and
- click "Apply."

Copies of any documents suspected of containing secure test questions or information from secure tests must be submitted to the Annual Testing Program through the regional accountability coordinator (RAC) for clearance before use in the PSU. Appropriate items for review would be any material of which the origin is not known. PSUs and the Annual Testing Program must work together to maintain test security.

Testing Notification

According to 16 N.C. Admin. Code 06D .0307(g), "LEAs shall, at the beginning of each school year, provide information to students and parents or guardians advising them of the districtwide and State-mandated tests that students will be required to take during that school year. In addition, LEAs shall advise students and parents or guardians of the dates the tests will be administered and how the results from the tests will be used. Also, information provided to parents shall include whether the State Board of Education or the local board of education requires the test(s). (h) LEAs shall report scores resulting from the administration State-mandated tests from the Annual Testing Program to students and parents or guardians no later than 30 days after the test is administered and along with available score interpretation information within 30 days from receipt of the scores and interpretive documentation from the NCDPI. Selected LEAs and schools, determined through stratified random samples, shall participate in field testing and other sample testing."

Testing Window

Per G.S. §115C-174.12(a)(4), "all annual assessments of student achievement adopted by the State Board of Education pursuant to G.S. §115C-174.11(c)(1) and (3) and all final exams for courses shall be administered within the final ten (10) instructional days of the school year

for yearlong courses and within the final five (5) instructional days of the semester for semester courses."

All state-mandated tests have a designated test date or testing window. The testing window is outlined in the *North Carolina Operational Testing Calendar*, which is posted on the NCDPI's Testing and School Accountability website. Failing to administer the secure tests on the test date or during the testing window designated by the Annual Testing Program results in a testing irregularity.

Test Materials

The appropriate test administration guide must be provided to test administrators on days before the test administration. The test administrator must thoroughly read the guide before attending the training session, so the school test coordinator can answer any questions the test administrator may have. All test administrators must receive a hard copy of the guide before administering the test. All other test materials must be distributed to test administrators immediately before each test administration and returned to the principal or school test coordinator at the end of each test administration. Test administrators are responsible for all materials in their care.

In order to administer statewide tests to North Carolina students in a fair and equitable manner, only the testing materials that are specified in the appropriate test administration guide, or are part of an approved accommodation, are allowed during the test administration.

At no time are proctors to be alone with secure test materials, including devices with tests open on the screen (e.g., Start screen, Pause screen, questions displayed). Proctors must not pick up test materials from or return test materials to the school test coordinator at the beginning or the end of testing. Every effort must be made to minimize unauthorized access to secure state tests before and after each test administration.

The PSU test coordinator provides schools with the test materials specified in the appropriate test administration guide. School test coordinators also provide directions to test administrators for distributing the test materials.

Placing test materials on students' desks before the beginning of a test administration is a violation of the procedures outlined in the test administration guides and the *Testing Code of Ethics*.

With the exception of scratch paper, graph paper, and writing utensils, the test administrator should not give students additional materials during the

test administration without the prior written consent of the Annual Testing Program. Only supplemental materials specified in the appropriate test administration guide (or published supplements or updates) may be used during the test administration. Reference books, textbooks, thesauruses, bookmarks, multiplication tables, number lines, music, MP3 players, cameras, cell phones, personal learning devices, personal computers, smartpens, smartwatches, or any other electronic devices are prohibited during the administration of any test in the Annual Testing Program (see Testing Room, Testing Violations, and Irregularities).

Accounting For and Storing Test Materials

According to 16 N.C. Admin Code 06D .0307(d), "The North Carolina Department of Public Instruction (NCDPI) shall supply the secure tests to LEAs. LEAs shall:

(1) account to the NCDPI for all secure tests received;
(2) provide a secure, locked storage facility for all secure tests received;
(3) prohibit the reproduction of any or all parts of a secure test; and
(4) prohibit their employees from disclosing the content of a secure test or specific items contained in a secure except as necessary to administer the test."

Every PSU must have a clearly defined system of checkout and check-in of test materials to ensure at each level of distribution and collection (district, school, and classroom) all secure materials are tracked and accounted for. PSU test coordinators must inventory test materials upon arrival from Technical Outreach for Public Schools (TOPS) and must immediately inform TOPS of any discrepancies in the shipment.

PSU test coordinators must house all secure test materials in a secure, locked facility and must ensure each school test coordinator receives, stores, and distributes test materials in a secure manner. Secure test materials may be stored at a school for only a short period before and after the test administration. Every effort must be made to minimize school personnel's access to secure state tests.

As established in 16 N.C. Admin. Code 06D .0311, the *Testing Code of Ethics*, the principal shall ensure test security in the school building and store the test materials in a secure, locked facility except when in use. The principal must establish a procedure to have test materials distributed immediately before each test administration. Before each test administration, the school test coordinator must accurately count and distribute test materials to each test administrator.

Each test administrator must count and record in writing the number of secure test materials and supplemental materials (i.e., those specified in the test administration guide or published supplements or updates)

- when the materials are first received,
- before the distribution of materials to students,
- after the test administration, and
- when the materials are returned to the school test coordinator.

Any discrepancies in the counts must be reported to the school test coordinator or principal immediately.

All testing materials must be returned to the school test coordinator according to the directions specified in the test administration guide. Immediately after each test administration, the school test coordinator shall collect, count, and return all test materials to the secure, locked facility. Any discrepancies in the count must be reported immediately to the PSU test coordinator. Upon notification, the PSU test coordinator must report the discrepancies to the RAC and ensure all procedures in the Online Testing Irregularity Submission System (OTISS) are followed and the OTISS report is submitted within five days of the occurrence. Procedures established by the school for tracking and accounting for test materials must be provided upon request to the district test coordinator or the Annual Testing Program.

Recognize and Report Testing Violations or Irregularities
Test administrators (and proctors, if utilized) must report any alleged testing violation or testing irregularity to the school test coordinator on the day of the occurrence.

Testing Room, Testing Violations, and Irregularities
The use of the following items in the testing room may constitute a misadministration or violation of the *Testing Code of Ethics*. On days before testing, teachers are expected to announce to students which items cannot be accessed in the testing room.

- *Electronic devices.* Other than permitted calculators, students are not allowed to use or have in their possession cell phones or any other electronic recording, listening, scanning, communication, or photographic devices at any time during testing, including breaks. Any student found or observed with a cell phone or electronic device during testing time must be dismissed from testing and a misadministration declared for that student.
    - If a student must be removed from testing because the student has a cell phone or electronic device during testing, the test administrator must not leave the testing room unattended. The test

- Accommodation provided but not approved or documented
- Accommodation *Test Read Aloud* (*in English*) or *Interpreter/Transliterator Signs/Cues Test* provided during a test that measures reading skills (e.g., EOC English II or EOG reading)

Security Issues

- Allowing others access to the tests, including school or district personnel who do not have a legitimate need
- Allowing students to review secure test materials before the test administration
- Missing test materials
- Secure test materials not properly returned
- For online testing, failing to maintain security of NC Education username and password
- Failing to store secure test materials in a secure, locked facility
- Failure to cover or remove bulletin board materials, classroom displays, or reference materials (printed or attached) on students' desks that provide information regarding test-taking strategies or the content being measured by the test
- Reproducing items from secure test(s) in any manner or form
- Using items from secure test(s) for instruction
- Failing to return the originally distributed number of test materials to designated school personnel
- Discussing with others any of the test items or information contained in the tests or writing about them on the internet or on social media sites

Monitoring Issues

- Failing to prevent students from cheating by copying, using a cheat sheet, or asking for information
- Failing to prevent students from gaining an unfair advantage through the use of cell phones, text messages, or other means
- Allowing students to remove secure materials from the testing site
- Failing to monitor students and secure test materials during breaks
- For online testing, leaving devices unsupervised when secure online tests are open and visible
- Leaving the testing room unmonitored when students and secure materials are present

Procedural Issues

- Paraphrasing, omitting, revising, interpreting, explaining, or rewriting the script, directions, or test items, including answer choices
- Reading or tampering with (e.g., altering, changing, modifying, erasing, deleting, or scoring) student responses to the test items

- Failing to administer the secure tests on the test date or during the testing window designated by the Annual Testing Program
- Failing to follow the test schedule procedures or makeup test schedule designated by the Annual Testing Program
- Providing students with additional time beyond the designated maximum time specified in the test administration guide (except for students with documented special needs requiring accommodations, such as *Scheduled Extended Time*)
- Test administrator or proctor giving improper assistance during the test

Technical Issues (Online Testing)

- Online test connectivity or technical problems
    - Schools must report online test connectivity and technical problems that occur during the administration of online tests when a student(s) is not able to successfully complete the test. Reports do not need to be entered for students who successfully complete the test despite a technical issue.
- Online test questions not displaying properly

Testing Environment

The principal must designate an area for the test administration that provides an environment that minimizes distractions and disruptions for students. All rooms designated for test administrations (including any rooms to which students may be relocated for testing) must be quiet, orderly, comfortable, and have adequate seating, lighting, and heating or cooling. Each student must have enough space in which to work. Seating must be arranged to discourage students from sharing responses.

Monitoring Students during the Test Administration

A primary responsibility of the test administrator is monitoring the test administration. To avoid the appearance of a conflict of interest and allegations of impropriety, test administrators and proctors should not be assigned to administer or proctor test sessions where their relatives or wards are to be tested. Relatives and wards include children, stepchildren, grandchildren, nieces, nephews, siblings, in-laws, and persons under the test administrator's or proctor's guardianship. Additionally, test administrators should not administer tests with a proctor who is a personal family member or a close acquaintance.

The test administrator and proctor must not leave students unattended at any time during the test administration. The test administrator must remain in the room throughout the entire test administration unless an emergency arises. If an emergency arises and the test administrator must leave the

room, the school test coordinator must be notified to arrange for another trained test administrator to be present for the duration of testing.

Test administrators and proctors must remain attentive to their testing responsibilities throughout the entire test administration. Personal cell phones and electronic devices must not be used during the test administration, including breaks.

Reading (except for the test administration guide or supplemental testing policy information); grading papers; using a computer, cell phone, or other electronic device; talking casually with a proctor or other staff; or engaging in any activity in the room not related to the test administration is not allowed.

Test administrators and proctors must avoid creating distractions and causing testing irregularities while monitoring students during the test. During training, test administrators and proctors must be made aware of what they can and cannot do to assist students.

Each student must complete the test without assistance for the scores to reflect the student's ability. During training, test administrators must be made aware of the types of student assistance they are permitted to provide during the test. To ensure an equitable and standardized testing experience for all students, test administrators must adhere to the following guidelines.

The test administrator and proctor must monitor the test administration by walking frequently and quietly throughout the room and scanning the students' work areas to ensure students follow the test directions, perform the required tasks, do not share responses, and those eligible have access to required accommodations.

- When either the test administrator or proctor needs to sit during the test administration, they should maintain an unobstructed view of and easy access to students.
- Test administrators and proctors are not to read test questions from students' test books or from computer monitors used for online tests (except for students with documented special needs requiring accommodations, such as the *Test Read Aloud [in English]*).
- Test administrators and proctors cannot indicate answers to students. Some examples include, but are not limited to,
    - telling students to "look at the question again" or offering similar advice;
    - making a facial expression, hand gesture, voice inflection, or an utterance (e.g., coughing, clearing throat) to indicate approval or disapproval of the student's response; and

  - standing beside the desk, reading a question, looking at the student's response, and then pointing to the correct answer or pointing to the question as if to indicate, "read the question again because you have the wrong answer."
- Test administrators and proctors cannot help students by
  - explaining the directions in their own words;
  - explaining the meaning of any word in the directions, test questions, or answer choices;
  - rephrasing test questions;
  - translating a word or phrase into another language; or
  - providing synonyms for unknown words.

Follow a Uniform Process of Administration

All tests that are part of the Annual Testing Program require a standardized process of administration. For test results to be valid, all procedures included in the North Carolina test administration guides must be followed. Test administrators must follow and present the directions as written in the test administration guides. It is a violation of the *Testing Code of Ethics* to omit, rewrite, or paraphrase orally or in writing the instructions presented in the test administration guides without the prior written consent of the Annual Testing Program. Unethical testing practices include, but are not limited to, interpreting, explaining, or paraphrasing the test directions, reading selections, or test questions. Test administrators may repeat test directions as many times as necessary for the student(s) to understand but are not permitted to provide any specific assistance with answering test questions. For example, test administrators and proctors are not permitted to clarify test directions, provide synonyms for unknown words, or rephrase questions. Each student must complete his or her own work without assistance in order for the scores to reflect the student's ability.

Directions located in the test administration guides for distributing test materials must be followed. Per the test administration guides, only NCDPI-approved designated features and supplemental materials may be used during the test administration. If NCDPI-approved designated features (e.g., highlighters or color acetate overlays) or supplemental materials (e.g., example response spaces for constructed response [CR] items or mathematics grids for mathematics tests [for students with *Students Marks Answers in Test Book* accommodation only]) will be used, the test administrator must give students these items before beginning the testing session.

Placing the required test materials, such as the answer sheets, test books, or calculators, on students' desks before beginning the test administration is a violation of the procedures outlined in the test administration guides and

16 NCAC 06D .0311 TESTING CODE OF ETHICS

(a) This Rule shall apply to all public school unit (PSU) employees or agents while they are administering the Annual Testing Program defined in Rule .0307(c) of this Section.

(b) The PSU shall develop local policies and procedures to ensure maximum test security in coordination with the policies and procedures developed by the test publisher.

(c) The PSU shall require all testing coordinators, school test coordinators, test administrators and proctors to be trained as required in Rule .0308 of this Section.

(d) The PSU shall designate the personnel who are authorized to have access to secure test materials. "Access" to test materials by school personnel means handling the materials but does not include reviewing tests or analyzing test items.

(1) Persons who have access to secure test materials shall not use those materials for any purpose other than test administration.

(2) No person shall copy, reproduce, or paraphrase the test materials without the express written consent of the test publisher.

(e) The principal shall store test materials in a locked facility to which only the principal has access. The principal shall not allow anyone access to the test materials except as necessary for administration.

(f) When PSU personnel discover loss of materials, failure to account for materials, or any evidence of unauthorized access to the materials, they shall report the discovery without delay to the principal, school test coordinator, school system (LEA) test coordinator, or charter school director.

(g) PSUs shall ensure that test coordinators:

(1) plan and implement training for school test coordinators, test administrators, and proctors;

(2) ensure each school test coordinator and test administrator is trained in accordance with Rule .0308 of this Section; and

(3) in conjunction with program administrators, ensure test accommodations to students entitled to testing accommodations as defined in 16 NCAC 06G .0315; are documented and provided.

(h) The principal or the principal's designee shall serve as school test coordinator.

(i) The principal shall ensure the school test coordinator maintains test security and accountability of test materials, including taking the following actions:

(1) before each test administration, the school test coordinator shall count and distribute test materials;

(2) after each test administration, the school test coordinator shall without delay collect, count, and return all test materials to the locked storage facility;

(3) establishes procedures to assure all students participating in the Annual Testing Program have an equal opportunity to demonstrate their knowledge on the test; and

(4) identifies and trains personnel, proctors, and backup personnel for test administrations.

(j) Teachers may help students improve test-taking skills by:

(1) helping students become familiar with test formats using curricular content;

(2) teaching students test-taking strategies and providing practice sessions;

(3) helping students learn ways of preparing to take tests; and

(4) using resource materials such as test questions from test item banks and linking documents in instruction and test preparation.

(k) With respect to test administration, PSUs shall:

(1) assure each school establishes procedures to ensure all test administrators comply with test publisher guidelines;

(2) inform the local board of education of any breach of this code of ethics; and

(3) inform test coordinators and principals of their responsibilities.

(l) The school test coordinator shall:

(1) assure school personnel know the content of rules in this Section and local testing policies;

(2) implement the school system and local testing policies and procedures to assure all students participating in the Annual Testing Program have an equal opportunity to demonstrate their knowledge on the test;

(3) ensure proctors are trained; and

(4) ensure all violations of rules in this Section and local testing policies are reported to the school system (LEA) test coordinator.

(m) Test administrators shall:

(1) administer tests according to the directions in the assessment guide and any subsequent updates developed by the test publisher;

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