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Co-Teaching vs. Resource Room: Which Yields Better Growth on Oral Reading Fluency Measures?

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CO-TEACHING VS. RESOURCE ROOM: WHICH YIELDS BETTER GROWTH ON ORAL READING FLUENCY MEASURES?

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Title: Co-Teaching vs. Resource Room: Which Yields Better Growth on Oral Reading Fluency Measures?

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The purpose of this non-experimental casual comparative study was to examine the relationship between the educational environment (i.e., co-taught, or resource room), and academic growth with oral reading fluency (ORF) measures for second and third grade students with disabilities. The study also explored possible unique predictors of increased ORF for second and third grade students with disabilities. The data indicate that the educational environment or service delivery model had the most significant effect on students' ORF scores (t = -6.03, p = .000). Students' gender, type of disability, and the level of support received were not significant predictors of their ORF scores at the end of the school year. Students who participated in co-taught classrooms scored 12.05 points higher on ORF at the end of the school year than students in resource classrooms (B = -12.05, p = .000). These results support the least restrictive environment (LRE) mandate under IDEA (2004) and provide educational leaders more quantitative data to support the educational placement decisions for students with disabilities during IEP team meetings.

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INTRODUCTION

Over the years, educators have provided students with disabilities a variety of delivery models for instruction to attempt to meet the needs of all students and maintain compliance with special education laws and mandates. In particular, the Individuals with Disabilities Education Act (IDEA) (2004) requires that all students with disabilities be educated in the Least Restrictive Environment (LRE). The mandate states:

> To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, 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. (IDEA, 2004, PL-108-446, Section 300.114(a)(2))

While language related to the LRE was first introduced to the American school system more than 45 years ago (see PL94-142 of the Education for All Handicapped Children Act of 1975), the application of LRE remains problematic for multiple reasons, primarily involving where a student identified as needing special education services will receive educational supports and services (Zigmond, 2003; Zigmond, Kloo, & Volonino 2009). The reauthorization of IDEA (2004), the No Child Left Behind (NCLB) Act of 2001, and court cases (e.g., *Gaskin v. Pennsylvania* [PDE], 2006) have provided greater clarification to the definition of LRE. At the same time, special educators and administrators are now accountable to review, analyze, and report where and how services are being provided to students with disabilities. Moreover, new language in IDEA (2004) and greater alignment with NCLB (e.g., educational testing,

accountability, and the implementation of evidence-based practices [EBPs]), continues to require educators to provide Free Appropriate Public Education (FAPE) in the least restrictive environment with appropriate supplemental aids and services. Students in need of specialized services must receive those services in the LRE (IDEA, 2004). The LRE must include nondisabled peers to the maximum extent possible, with appropriate supplemental aids and services. School districts must make a good-faith effort to meet these requirements, exhausting all possible accommodations to the general education curriculum. Using any appropriate social or behavior modifications, educators must change the physical environment, in some cases. In Pennsylvania, these efforts to deliver services to students with disabilities have been achieved by providing instruction through two approaches: (a) collaborative teaching [i.e. co-teaching], or (b) resource-room instruction.

Co-teaching is a service delivery model that provides students exposure to the general education curriculum, along with the special education services that are paramount for students' learning success. The co-teaching delivery model for instruction that has become popular in school systems in the 21st century attempts to meet the requirements of IDEA and NCLB. Co-teaching was originally labeled cooperative teaching by Bauwens, Hourcade, and Friend (1989) and then shortened to co-teaching several years later by Cook and Friend (1995). The definition has not changed much over the years but the terminology in the definition varies. For example, according to Murawski and Dieker (2004), co-teaching is a service delivery model designed to meet the needs of students in a general education setting with both a general education and a special education teacher. Friend (2008) defined co-teaching as both general and special educators sharing responsibility for all their students in all facets of the classroom, such as student learning, planning, and assessments. Both teachers together provide a learning

experience that cannot be replicated by one teacher. Possible co-teaching models for teachers to utilize when delivering instruction in a co-taught classroom include: (a) one teaching/one assisting, (b) station teaching, (c) parallel teaching, (d) alternative teaching, and (e) team teaching (refer to Zigmond & Magiera, 2001).

The resource room is another service delivery model that school districts continue to utilize to meet the needs of students. It is a place where students can receive an alternative or specialized curriculum to meet their academic needs (Watson, 2014). Evidence suggests that students with disabilities feel more comfortable and secure and work at their individual instructional level more effectively in this service delivery model (Bentum & Aaron, 2003). The resource room is considered for students when their individual needs cannot be met in a mainstreamed classroom (Walther-Thomas, 1997). By receiving instruction in the resource room, students experience academic success by completing work independently which, in turn, builds self-esteem (Bentum & Aaron, 2003). Yet, many questions remain unanswered about receiving services in the resource room and how they compare to other delivery models.

Statement of the Problem

This study sought to address the lack of quantitative research on achievement of students with disabilities in service-delivery models for reading instruction. This research may allow special educators, administrators, and parents to make informed decisions on the effectiveness of the co-teaching model and the resource room delivery system, providing services in the LRE. With the reauthorization of IDEA (2004) and the several court cases, such as the Gaskin Settlement (Gaskin v. Pennsylvania, 1995), service-delivery-model effectiveness has been a centerpiece of policy-related research, due to the constraints it places on defining the LRE for students with special needs. Settlements over the past two decades (e.g., Gaskin v. Pennsylvania,

1995; Oberti v. Board of Education, 1993), along with educational policy (e.g., NCLB, 2001), have strengthened public understanding of LRE, in particular:

> The notion that special classes, separate schooling, or other removal of children with disabilities from the regular education environment should occur ONLY if the nature of severity of the disability is such that education in regular classes, with the use of supplementary aids and services, cannot be achieved satisfactorily…[and] supplementary aids and services should be available to all students who need them, be designed to provide educational benefit and be provided in a manner that avoids stigmatizing students (Gaskin v. Commonwealth of PA, 2006, p. 16).

While Individual Education Plan (IEP) teams are accountable for making decisions that will meet students' academic needs and allow them to make progress, terminology within the law, such as "good faith effort," "to the maximum extent possible," and "as deemed appropriate," has raised questions about the decision-making process. Moreover, policy initiatives targeting greater inclusion regarding the LRE largely conflict with instructional practice for students with disabilities whereby they received individualized instruction in a resource room (Young & Bass, 2013). As policy initiatives take shape across the United States, some school districts have adopted new, more inclusive approaches for providing reading instruction (e.g., co-teaching in regular education classrooms), while others rely on long-held instructional practice for students with disabilities (e.g., pull-out resource room). The magnitude of the decisions the IEP teams make for students in the primary grades is significant because these decisions may determine, or limit students' future success, and so it is important that they are based on solid research.

According to the Pennsylvania State Data Center, 1,718,530 school-age students were enrolled in Pennsylvania schools in the 2016-2017 school year. Among this population of K-12 learners, 283,145 were in need of special education services. As a result, 283,145 IEP teams met during the 2016-2017 school year to make decisions about appropriate educational environment, supplemental aids and services, and the type of service delivery model that best fits the students' needs. This ratio suggests that 16.5% of Pennsylvania students are receiving special education services. Given these numbers, it is imperative that educators meet the needs of all students and continue to comply with state and federal mandates with regard to students' LRE.

School districts in Pennsylvania are held accountable for decisions made for children with disabilities through Special Education Monitoring Compliance (Pennsylvania Department of Education). PDE is responsible for ensuring that all local education agencies (LEA) are responsible for providing special education services and programs that comply with state and federal laws and regulations. The Bureau of Special Education (BSE) developed administrative procedures to monitor district programs, compliance, evaluate the appropriateness, effectiveness, and accountability of special-education services and programs. Districts are monitored every six years and complete a self-assessment tool titled, *Compliance Monitoring for Continuous Improvement* (CMCI) (PDE, n.d.). The LRE section of the CMCI tool provides guided questions to compare district averages of educational environments to state averages. If there is a large discrepancy between the state average and district average of the LRE, districts are required to implement actions to correct this discrepancy. Co-teaching is a service delivery model that can be utilized to increase a district's LRE percentages and, therefore close the gap between state and district's LRE percentages.

With LEA accountability, educational policy must provide a least restrictive environment for students needing special education services or programs. Special educators, administrators, and parents must make decisions based on individual needs and solid research for primary students. Terminology in the laws and mandates is often ambiguous and adds to the need for data to assist and to support IEP decision making. In response, this research study was designed to add to the empirical data to support appropriate service delivery models in the area of reading in the primary grades.

Research Questions

1. What academic growth, if any, do second and third grade students with disabilities make with grade-level reading curriculum with the co-teaching delivery model or the adapted delivery model in the resource room?
2. What are the unique predictors of Oral Reading Fluency (ORF) among second and third grade students with disabilities who receive services within a co-teaching classroom compared to receiving services within a resource classroom?

Hypothesis

The researcher predicted that grade two and grade three students with disabilities who receive services in a resource classroom will outperform those who receive services in co-taught classrooms on measures of oral reading fluency (ORF). Literature reviews dating back to the late 1970s (see Sindelar & Deno, 1978) have favored resource rooms for providing more individualized, academic-specific instruction; this type of instruction led to better academic outcomes than general-education classrooms. These results have been especially strong among students with learning disabilities and behavior problems (Carlberg & Kavale, 1980; Leinhardt & Pallay, 1982). Despite recent educational initiatives, however, few researchers have examined

the academic outcomes of students with disabilities who participate in co-taught and resource classrooms.

Purpose of the Study

The purpose to the study was to: (a) examine the relationship between educational environment (i.e. co-teaching and resource room) for second and third grade students with disabilities and academic growth on ORF measures, (b) determine the effectiveness of service delivery models, and (c) identify possible predictors of ORF, while controlling for other factors for student reading growth. This study hoped to determine if one service delivery model is more effective than the other. Second and third graders were chosen for the sample because both grade levels participate in regular ORF testing. Moreover, several districts in western Pennsylvania continue to use both co-teaching and resource room models to deliver services to students with disabilities.

Significance of the Study

Inclusion and collaboration are two aspects of educational models that are not going away in the 21st century (Barger-Anderson, Isherwood, & Merhaut, 2013); therefore, the significance of providing parents, administrators, and educators with statistical research, supporting one delivery model over another, was essential to assist these teams in making informed decisions for students with disabilities. The research focused on whether instruction utilizing the co-teaching service delivery model or support service in the resource room would increase student achievement based on students' oral reading fluency scores (ORF). The decisions an IEP team makes during this complex process will affect the student's entire academic career. This researcher has gathered quantitative data to support one service delivery model or another when IEP team members are determining the appropriate supplemental aids and services to meet a

student's academic needs in reading instruction. The research could impact academic decision-making in helping to meet the needs of students with disabilities.

Research Design

The researcher designed a non-experimental, causal-comparative quantitative study to compare primary students' achievement in a co-taught classroom versus a resource room. Utilizing the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) ORF tests, oral reading fluency (ORF) tests are administered three times in second and third grade classrooms. The research uses a regression model to analyze existing ORF data collected from school districts in western Pennsylvania that use DIBELS. A priori power-analysis in G Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicates that a sample size of 100 students is sufficient for detecting a meaningful effect (if one exists) with the sample. The criterion variable in the analysis was students' ORF scores. The possible predictor variables were students' educational environment defined as the service delivery model: (a) co-teaching or (b) resource room, type of disability, the amount of time receiving support, and the amount of time spent in a general-education environment.

Theoretical Framework

One theory that supports this study is the concept of Zone of Proximal Development (ZPD), formulated by the psychologist, Lev Vygotsky, and based on theories of child development (Kozulin, Findis, Ageyez, & Miller, 2003). According to Vygotsky (1978), the ZPD is the distance between the **actual** student's developmental level as determined by independent problem-solving and the level of **potential** development determined through problem-solving under adult guidance or in collaboration with a more capable peer. It is also defined as what a child is able to do today in collaboration and what he will be able to do

independently tomorrow (Lui, 2012). Many scholars utilize Vygotsky's theory to support instructional timing and define ZPD as a "time" or "spot" between what a child can do independently compared to what he or she can do with assistance or where instruction on a skill will be most effective (Lui, 2012). Vygotsky (1978) viewed learning as a continuum or series of growth points, rather than the child knows it or he doesn't. When utilizing ZPD, educators understand a student's level of development and adjust instruction slightly above that level. The ZPD can be used in the primary grades with all students, especially those identified as being in need of special education services. Educators should instruct at the right level of difficulty—neither too hard nor too easy—for optimal learning to take place (Fountas & Pinnell, 2008). Because one of the many responsibilities of our schools is to guide students along the continuum of learning to become fluent readers, the ZPD provides a support or an understanding of the need to match the individual's learning capacity with his or her level of reading achievement. For students in need of special education services, it is imperative to identify their ZPD to provide them the services in the LRE appropriate to their needs.

Another theory that is relevant to student learning outcomes within an educational setting is the ecological systems theory developed by Bronfenbrenner (1979), which attempts to explain the larger picture of students' lives and how interactions in their lives affect their learning. Bronfenbrenner (1979) developed the theory to explain human development and the interaction between individuals and their environments. The theory proposed that human development is affected by everything around them and analyzes the inherent qualities of children and the effects of their environmental systems on them.

The theory consists of five systems that are not separate, but overlapping and interrelated. The first system, the microsystem, is the immediate environment, such as the child's home,

school, or daycare. The second, the mesosystem, is the social and cultural values of an individual and links the microsystems together, such as home and school or workplace. The third, the exosystem, is a person's indirect environment that may indirectly influence their environment of which they have no control. The fourth, the macrosystem, is cultural values, traditions, attitudes, and laws. The last system, chronosystem, takes into account the changes during a person's lifespan (Bronfenbrenner, 1986; Bronfenbrenner, 1979). The theory implies that the interaction among all these systems may have a stronger effect on a student's learning than the setting in which he learns.

Both theories are relevant to this research study and explain the interaction of the students with learning and their environments. The ecological systems theory indicates that how students learn in a co-teaching classroom or a resource room may have a great deal to do with their interactions with systems, identified by Bronfenbrenner, in their lives. The ZPD explains that students being developmentally ready to learn specific skills may influence their response to specific instruction in the co-teaching or resource room.

Assumptions and Limitations

Several assumptions were included in this study. The first, due to requirements based on the PDE teacher evaluation process, was that specially-designed instruction (SDI) in a student's IEP, designed and written by a special education teacher was deemed to be at least proficient, regardless of the location. A second assumption, based on IDEA regulations (IDEA, 2004), was that regardless of the service delivery model, progress monitoring will occur at least every two weeks. Another assumption, made because the grade-level curriculum was deemed inadequate for the student to make academic gains and an alternative curriculum was warranted, was related to the use of an alternative curriculum in a resource room, such as SRA Reading Mastery,

Corrective Reading or Wilson Fundations. A fourth assumption, made because current research supports co-teaching strategies and models, was that teachers in the co-teaching classrooms share all aspects of the classroom and co-plan, co-assess, and co-instruct, utilizing a variety of co-teaching models. The final assumption, based on the LRE mandate, that services must be a continuum; the IEP teams are making appropriate student placement of services based on student need and use of supplementary aids and services, not lack of resources or financial support.

The limitations to this study need to be addressed. The first limitation that may affect the results of the data was teacher experience because teachers have a variety of educational backgrounds, talents, strengths, and experiences. These experiences and strengths play a role in teachers' abilities to assist students in meeting their potential. A second limitation may be the sample of students. At the primary levels, school districts attempt to provide students with several interventions before moving to an evaluation; therefore, students in second and third grade may not have been identified for this study. A final limitation is whether the district offered one or both service delivery models. Due to financial constraints, districts often offer only one of the models.

Definition of Terms

Co-teaching involves both general and special educators sharing responsibility for all of their students in all facets of the classroom, such as student learning, planning, and assessments (Friend, 2008)

Least Restrictive Environment (LRE) is a an environment in which a student who is identified with a disability has the opportunity to be educated with non-disabled peers to the maximum extent possible (IDEA, 2004).

Local Education Agency (LEA) is a public board of education or other public authority legally constituted within a state for either administrative control or direction to perform a service (IDEA, 2004).

Oral Reading Fluency (ORF) is recognizing words and reading them automatically, effortlessly, and efficiently with expression (Rasinski, 2003).

Primary students with disabilities is second and third grade students identified with at least one of the 13 categories of disability recognized under IDEA (2004) regulations.

Resource Room is a place where students can receive an alternative or specialized curriculum to meet their academic needs (Watson, 2014).

Summary

While a variety of service delivery models for students with disabilities in the LRE (Swanson, Harris, & Graham, 2014) exists, school systems in the state of Pennsylvania have largely relied on two models: (a) co-teaching and (b) resource room. Despite the emphasis on both models in districts across the state, research comparing the effects of student performance in co-taught and resource classrooms is nonexistent in the literature. With the increase in the number of students in need of some type of special education support and increased accountability regarding special education regulations, this study investigated the effects that co-teaching and resource room approaches had on student reading achievement.

CHAPTER 2

REVIEW OF LITERATURE

One of the major concerns in special education over the past several decades has been declining student achievement (Adnot, Dee, Katz, & Wyckoff, 2017; Henderson & Mapp, 2002). While researchers continue to search for more effective methods to meet the needs of all students, one promising approach is co-teaching (Friend, 2008). Co-teaching has provided students with disabilities greater access to the general education curriculum and, at the same time, provided specialized instruction that they need to succeed (Friend, 2008). Unfortunately, the literature on co-teaching and how it compares to traditional resource room instruction, which has long been used to support students with disabilities, remains sparse. By extension, little is understood about how these two practices (i.e., co-teaching and resource-room instruction) influence the impact on students' early literacy skills in the area of reading measured by oral reading fluency (ORF) in the primary grades. Reading fluency is important because ORF is a central assessment measure used in some schools throughout the United States and an important predictor of later reading outcomes (Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998).

The purpose of this review is to investigate the literature related to co-teaching and resource-room instruction, and to discover how both practices fit into the larger picture for students with disabilities as measured by the ORF results. The lack of literature supports the need for more empirical research to compare the effectiveness of instruction in a co-taught classroom versus instruction in a resource room, with an alternative curriculum. Co-teaching has been operationally-defined in the literature as shared responsibility between the general-education teacher and special-education teacher to meet the needs of all students with regard to planning and preparation, instruction, and assessment (Cook & Friend,1995; Friend, 2008; Kloo & Zigmond, 2008; Murawski & Dieker, 2008). In contrast, a resource room is a place where

students can receive an alternative or specialized curriculum to meet their academic needs (Watson, 2014). While much literature has been written about co-teaching since the passage of IDEA (2004), resource room instruction has garnered minimal attention from the research community. Yet, many school districts in western Pennsylvania continue to rely on both resource room instruction and co-teaching in elementary schools.

This review provides a systematic examination of the literature on co-teaching and resource room instruction for students with disabilities in the primary grades. First, the review provides an historical perspective of special education. Secondly, the researcher describes how case law influenced special education policies and law with regard to providing a least restrictive environment. Thirdly, service delivery models, specifically the literature on co-teaching and resource room instruction, are discussed, including practical benefits along with challenges to both delivery models. Finally, the researcher examines the importance of oral reading fluency for all students, as well as for students with disabilities.

History of Special Education

The Education for All Handicapped Children Act of 1975 (Public Law 94-142) was the first law that assisted educators and families in educating students with disabilities. Before this law was enacted, parents and educators agreed that educational systems were not meeting the needs of students with disabilities. More than half of these students were not receiving services that were equal to their peers, and at least one million were excluded from the public school setting. Many students with disabilities participated in general education but were not successful; therefore, parents were forced to seek services for their children outside of the public-school system at their own expense (Boyle & Weishaar, 2001). Court cases throughout the years influenced special education law and policy. *Pennsylvania Association for Retarded*

Citizens (PARC) v. Commonwealth of Pennsylvania was a leading court case in 1971, focusing on the right to education for all students, including equal-quality education for students with intellectual disabilities. Before this case was adjudicated, school districts excluded students who did not have a mental age of five. The case laid the foundation for the right to education. At the national level, it became the basis for the Education for all Handicapped Children Act, which is now the Individuals with Disabilities Education Act (IDEA, 2004). Not long after the PARC decision, a class-action suit, *Mills v. Board of Education* (1972), was filed in Federal District Court for the District of Columbia. The case represented 18,000 students who were denied or excluded from public education in Washington, DC and resulted in a judgment for the students and families mandating that the board provide all children with disabilities a publicly-supported education. The court outlined due process procedures for labeling, placement, and exclusion of students with disabilities. The procedural safeguards included the following: 1) the right to a hearing with representation and an impartial hearing officer; 2) the right to appeal; 3) the right to have access to records; and 4) the requirement of written notice at all stages of the process.

In 1990, Congress renamed PL 94-142 the Individuals with Disabilities Education Act (IDEA) with provisions to further protect students with disabilities and continue to provide free appropriate public education (FAPE). At the same time, IDEA added two new categories of disability. The 13 categories recognized are: 1) autism, 2) deaf-blindness, 3) deafness, 4) emotional disturbance, 5) hearing impairment, 6) learning disability, 7) mental retardation (now called intellectually-disabled (ID), 8) multiple disabilities, 9) orthopedic impairment, 10) other health impairment, 11) speech or language impairment, 12) traumatic brain injury, 13) visual impairment. IDEA also defined assistive technology and rehabilitation as related services and mandated transition plans to be a part of the IEP for students from the age of 16. In 1997, annual

goals and objectives in the IEP were required to be measurable (Boyle & Weishaar, 2001), and IDEA mandated free appropriate public education (FAPE) for children ages 3 to 21 who had been identified with at least one of the 13 recognized disability categories.

Under IDEA (2004), FAPE is considered special education, and related services are provided to students at no cost to their parents in an educational system that meets the state standards and is described in a child's IEP. The six guiding principles are: 1) zero reject/child find, 2) nondiscriminatory testing, 3) individual education plans, 4) least-restrictive environment, 5) procedural due process, and 6) parent participation. IDEA (2004) provides regulations for school districts regarding parental and student rights conforming to these six principles. FAPE became more defined in a recent court case, *Endrew F. v. Douglas County School District* (2017), in which the court interpreted the scope of FAPE within IDEA. Endrew, a child with autism, attended public school from kindergarten through fourth grade. In 2010, the parents did not support his proposed 5th grade IEP, believing that his fourth and fifth-grade IEPs were too similar. The parents withdrew Endrew from public school, placing him in a private setting that specialized in educating children with autism. Endrew made progress on his academic and behavioral goals. The parents were unable to gain tuition reimbursement from the district; therefore, the parents proceeded to due process. The courts decided that in order to continue the obligation of FAPE under the IDEA, districts must provide IEPs that enable a child to make appropriate progress "in light of" the child's circumstances. The court continued to support FAPE, but with the view that every child should have a chance to meet challenging objectives, not just achieve passing marks to advance from grade to grade.

With the reauthorization of the Individual with Disabilities Education Act in 2004, student and parental rights in special education were further defined, with the continued purpose

of IDEA to provide free appropriate public education to all students with disabilities. The law provides more defined guidelines, requirements, and regulations for educators when providing special education services to students. Special education services encompass every aspect of education for students with disabilities. It provides many viable service delivery models for IEP teams to consider. Educators and parents utilize IDEA regulations (2004) to guide planning for providing students with the most appropriate education.

Accompanying the shift in students' access was a move to student accountability and outcomes. IDEA (2004) became aligned with the No Child Left Behind (NCLB) Act (2001), defining highly-qualified teachers, while still providing FAPE in the least-restrictive environment with appropriate supplemental aids and services. NCLB Act (2001) emphasized student outcomes by expecting 100% of students to be proficient in reading on state required assessments by 2014. Districts were required to report data on student achievement and disaggregated groups, such as special-education students.

NCLB was replaced by the Every Student Succeeds Act (ESSA) signed by President Obama in 2015. ESSA does address the struggling student by requiring districts to have plans for high dropout rates, consistently struggling students, and students who are identified as needing special education. ESSA, like NCLB, requires districts to use evidence-based methods. ESSA also required districts to provide plans focusing on literacy and reading issues for students with disabilities. The literacy plans should include evidence-based methods, with instruction focusing on literacy skills including writing, phonological awareness, and decoding.

Least-Restrictive Environment

The guiding principle of least-restrictive environment (LRE) for students in need of special education services was addressed in PL 94-142 (1975) after the debate over whether students with disabilities should be educated. LRE is a continuum of services, and what might be appropriate for one student may not be appropriate for another. As time passed, the definition of LRE has gained the attention of lawmakers, parents, and educators and has been influenced by case law in attempt to clarify the continuum of services. LRE became a mandate under IDEA (2004). The mandate states:

> To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities are educated with children who are not disabled, and special classes, separate schooling, or other removal of children with disabilities from the regular education 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. (IDEA, 2004, PL 108-446. Section 300.114 (a)(2))

Federal legislation and years of case law have, at times, created complicated and contradictory procedures (Rozalski, Stewart, & Miller, 2010). Attempting to clarify LRE within federal legislation in 2006-2007, the U.S. Department of Education adjusted how states reflect the time students spend in the general education classroom (McLeskey, Landers, Hoppey, & Williamson, 2011). As a result of this change, Pennsylvania's State Performance Plan (SPP) (PDE, n.d) emphasized the need for accurate reporting of educational environment for students in need of special education services. Local Education Agencies (LEAs) began reporting special education data through the Pennsylvania Information Management System (PIMS).

IEP teams discuss and make decisions with regard to the most appropriate educational environment or service delivery model that will meet the needs of the student. According to the PDE publication of Guidelines for Calculating Education Environment for Federal Special Education Reporting (PDE, n.d.), the educational environment for students with disabilities is defined as the setting where the student is placed for educational services, not the amount of special education services the student receives. Within the IEP, the Section VII Educational Placement LRE is considered and discussed by the team. The Local Educational Agency (LEA) is required to ensure that to the maximum extent appropriate students in need of special education services be educated with students who are not disabled. IEP teams discuss and formally include a statement explaining the extent, if any, to which the student will not participate with students without disabilities, is in the regular education class, and explain the extent, if any, to which the student will not participate with students without disabilities in the regular education curriculum (PaTTAN, April 2014). The team must also consider the amount and types of special education supports and the location of the program. The amount of special education support is categorized as itinerant, supplemental, or full-time. Itinerant support is defined as services provided by special education personnel for 20% or less of the school day. Supplemental support is defined as services provided for more than 20% but less than 80% of the school day. Full-time support is defined as services provided 80% or more of the school day (PaTTAN, April 2014).

Section VIII of the IEP is the reporting of the educational environment or where the students are receiving support services. In Pennsylvania, this section is titled PENN DATA (PaTTAN, 2014). IEP teams must calculate and report the percentage that students are with nondisabled peers. That information and categorization is verified through the PIMS. The three

categories are: 1) in the regular classroom 80% or more of the day, 2) 79%-40% of the day, and 3) less than 40% of the day (PaTTAN, 2014). According to the 2016-2017 Compliance Monitoring for Continuous Improvement (CMCI) (PDE, n.d.), public agencies are required to ensure a continuum of services and include students with disabilities to the maximum extent possible. The LEA for auditing and compliance purposes examines the district's educational environment percentage reported through PIMS and compares that percentage to the state as a whole. The table below provides the percent of students with disabilities environment for the last four years in Pennsylvania.

Table 1

Percent of Students in Educational Environments in Pennsylvania

Year	Inside regular class 80% or more	Inside Regular class 79% -40%	Other setting
2013-2014	62.4	8.9	4.8
2014-2015	62	9.5	4.8
2015-2016	61.8	9.5	4.9
2016-2017	62.4	9	4.9

Note. Borrowed from the Pennsylvania State Data Center, 2013, 2014, 2015, 2016

Case law with regard to students' least-restrictive environment requires districts to take steps to provide all students in need of special education services access to the general education curriculum with nondisabled peers, utilizing supplemental aids and services to the maximum extent possible. LRE for students in need of special education services should also be at the school that they would otherwise attend if they were not identified as being in need of services. Several significant court cases provide a guide to what would be considered "best practice" in

determining LRE (Gruenhagen & Ross, 1995; Rozalski, Stewart, & Miller, 2010). The table below describes the case, the year, and the effect the case has on LRE.

Table 2

Special Education Court Cases Effecting LRE

Case	Date	Effects
Danny R.R. v. State Board of Ed.	1989	Develop a two-part test to determine the student's LRE
Greer v. Rome City School District	1991	Must provide appropriate supplemental aids and services
Oberti v. Board of Education of the Borough of Clementon	1993	Mainstream to the maximum appropriate and consider all supplemental aids and services
Board of Education in Sacramento, CA v. Holland	1994	Four-Factor test established
Gaskin v. Pennsylvania Department of Education	1994	Strengthened the continuum of LRE services and MUST exhaust all supplemental aids and services

Note. Text adapted from Gruenhagen & Ross, 1995; Rozalski, Stewart, & Miller, 2010

Danny R. R. v. State Board of Education (1989) was a Texas case and heard by the U.S. Court of Appeals, Fifth Circuit. Danny was a six-year-old boy with Down Syndrome. He was enrolled in a half-day special education, early childhood program. His parents wanted him to be placed in a program where he would have interaction with nondisabled peers. The district placed him in a half-day pre-kindergarten class, with the second half of his day in a special-education program. Danny began to struggle in both programs, so the district recommended that he participate with nondisabled peers during lunch and recess and continue his participation in the half-day special-education program. The parents did not agree and asked for a due-process

hearing. The Fifth Circuit decision was that the school district had complied with IDEA mainstreaming requirement by providing Danny the opportunity to participate with nondisabled peers during lunch and recess. The court also stated that the curriculum for Danny's abilities would modify it beyond recognition.

The two-part test that the court utilized became the basis for other courts when analyzing and determining LRE. The two-parts were (a) "whether education in the regular classroom, with the use of supplemental aids and services, can be achieved satisfactorily for a given child. If it cannot and the school intends to provide special education or to remove the child from regular education"; (b) "whether the school has mainstreamed the child to the maximum extent appropriate" (p. 1048).

Greer v. Rome City School District (1991) was a Georgia case heard by the Eleventh Circuit. Christy was a 10-year-old girl with Down Syndrome. The school district wanted to complete an evaluation on Christy before she entered kindergarten. The parents refused the evaluation and did not enroll her in kindergarten. Two years later, the parents wanted to enroll her in kindergarten, and again the school requested parental consent on the basis of allowing evaluation. The parents refused, and the district requested a hearing on the matter. The hearing officer found in favor of the district, and Christy was evaluated. The result of the evaluation was a recommendation that Christy be placed in a self-contained, special-education classroom. The parents refused the placement, and eventually, the case was heard in the Eleventh Circuit, which found in favor of continuing Christy's general education placement in kindergarten. The courts declared that the district had not considered a full range of supplemental aids and services.

Oberti v. Board of Education of the Borough of Clementon (1993) led the way for other court decisions focusing on least-restrictive environment for students with disabilities in need of

special-education services. Rafael Oberti was a child with Down Syndrome, and the school district was recommending placement in a segregated classroom outside his district which was an hour from his home. After the Oberti family filed a due-process complaint, many compromises were agreed upon between them and the school district, but the Oberti family felt that the district was not upholding its side of the agreement to provide supports for Raffael. The case eventually reached the U.S. Court of Appeals, Third Circuit, which ruled that school districts must consider a whole range of supplemental aids and services to assist in student success and make every effort to modify the regular education with trainings for teachers, if applicable. The court looked at the Daniel R. R. and Greer decisions and created a new test to examine LRE. The court reasoned that the school (a) "must consider the whole range of supplemental aids and services, including resource rooms and itinerant instruction"; (b) "compare the educational benefits the child will receive in a regular classroom and the benefits the child will receive in the segregated, special education classroom"; and (c) consider "the possible negative effect the child's inclusion may have on the education of the other children in the regular education classroom" (pp. 1021-1022). The outcome of the Oberti case was the basis for future landmark cases in districts considering LRE for students with disabilities in need of special-education services.

Sacramento City Unified School District Board of Education v. Rachel Holland (1994) originated in California and was heard in the Ninth Circuit. Rachel was an 11-year-old girl with a low IQ. She had previously attended a variety of special education programs. Her parents wanted her to have more time with nondisabled peers in a regular education classroom. The district recommended a special education program and regular-class placement for nonacademic subjects. The parents refused and enrolled Rachel in a private kindergarten program and

requested due process. Finding that Rachel benefitted from the program and was not disruptive, the court ordered the district to place Rachel in a full-time, regular, second grade classroom with supplemental aids and services. The Ninth Court cited prior decisions when determining LRE and built upon the Daniel R. R., Greer and Oberti reasoning. The court developed a four-part test which included (a) "educational benefits available in a regular classroom, supplemented with appropriate aids and services, as compared with the educational benefits of special education classroom"; (b) "non-academic benefits of interaction with children who were nondisabled"; (c) effect of Rachel's presence on the teacher and other children in the classroom"; and (d) "cost of mainstreaming Rachel in a regular classroom" (p. 59-60).

Gaskins v. Pennsylvania Department of Education (1994) led school districts and IEP teams to analyze the Least Restrictive Environment (LRE) for all students with disabilities. The Gaskin case was filed on behalf of Lydia Gaskin, a student with Down Syndrome, as a representative of all school-age students with disabilities in PA who may have been denied FAPE in a general education classroom. The purpose of the lawsuit was to have IEP teams consider the general-education setting with appropriate supplementary aids and services to meet the student's individual needs before exploring exclusionary settings or classrooms for students with disabilities. The settlement agreement in *Gaskin v. Pennsylvania* (PDE, n. d.) also strengthened the understanding of LRE by reiterating IDEA:

> Special classes, separate schooling, or other removal of children with disabilities from the regular education environment occurs only if the nature of severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. (PDE, n. d.)

The Gaskin settlement led to school districts exploring the co-teaching model as a viable means for delivery of special education services (Barger-Anderson, Isherwood, & Merhaut, 2013). Over time, co-teaching has gained popularity as a viable service delivery model in an attempt to provide students with effective instruction in the LRE and to maintain compliance with current special education law. According to the research, co-teaching appears to meet the requirements for providing students access to the general-education curriculum in the least restrictive environment with nondisabled peers (Barger-Anderson, Isherwood, & Merhaut, 2013).

Service Delivery Models

Service delivery models for special education services range from the general education setting with supports to private, specialized schooling outside of the public school. Once a student is identified as being in need of special education services, the IEP team must consider the LRE for the student and must consider the necessary continuum of services. Over the years, terminology within the special education community has changed to better describe the model and decrease the stigma. "Pull Out" programs were called self-contained classrooms where students with disabilities would be provided services separately for many academic subjects (Coben & Zigmond, 1986; Murawski & Dieker, 2013). Self-contained classrooms became known as resource rooms, a place where students could come and go for accommodations with testing, small-group instruction, or alternative or specialized curriculum to meet their academic needs (Watson, 2014). Mainstreaming was a term used when discussing the integration of students with disabilities into the general education setting, but it was not synonymous with inclusion. Mainstreaming is a concept within inclusion. Inclusion is a special education term that represents a value and belief system, not a delivery model. An inclusive school is welcoming,

empowering, and supportive of all academic, social/emotional and language learning of all students in shared environments (Falvey, Givner, & Kimm, 1995; Villa & Thousand, 2016). Cooperative learning or team teaching, introduced by Bauwens, Hourcade, and Friend (1989), was renamed co-teaching as it developed as a service delivery model.

Co-Teaching

Co-teaching, a service delivery model for many years, developed from school districts' attempts to provide students with effective instruction in the LRE. Bauwens, Hourcade, and Friend (1989) began the discussion with what they termed "cooperative teaching," which included team teaching, complementary instruction, and supportive learning activities. The term "cooperative learning" evolved into "co-teaching." Cook and Friend (1995) defined co-teaching as two or more professionals delivering substantive instruction to a blended group of students. Kloo and Zigmond (2008) defined it as having one special educator and one general educator sharing responsibility for planning, delivering, and evaluating instruction to diverse groups of students. According to Murawski and Dieker (2008), co-teaching is a service delivery model designed to meet the needs of students in a general education setting with both a general education teacher and a special education teacher. Friend (2008) better defined co-teaching as shared responsibility between the general education and special education teachers to meet the needs of all students with regard to planning and preparation, instruction, and assessment. Both teachers together provide a learning experience that could not be replicated with only one teacher. Barger-Anderson, Isherwood, and Merhaut (2013) defined co-teaching as shared collaborative educational practices between two or more professionals. Among professional educators, co-teaching is defined with a variety of terminology essentially meaning the same thing. Two educators should participate in co-instruction, co-planning, and co-assessing to be

considered co-teaching (Barger-Anderson, Isherwood, & Merhaut 2013; Friend, 2011). Based on the theory of ZPD (Vygotsky, 1978), students with disabilities engaged in a mixed-ability classroom, such as a co-teaching classroom, should become more independent at a task as a result of the interaction with a person more competent at the proposed task. The idea is that a person is able to complete many tasks alone, but with increased interaction and collaboration, that person can complete more complex tasks (Kozulin, Findis, Ageyez, & Miller, 2003).

Co-Teaching Models

Co-teaching provides students in need of special education an opportunity to gain knowledge through access to the general-education curriculum within the conventional general-education setting. Possible learning models for teachers to utilize when instructing in a co-taught classroom include (a) one teaching/one assist, (b) station teaching, (c) parallel teaching, (d) alternative teaching, and (e) team teaching (Barger-Anderson, Isherwood, & Merhaut, 2013; Zigmond & Magiera, 2001). Table 1 lists the five co-teaching models with definitions. Friend (2008) included the five models of co-teaching in addition to one teach/one observe; however, one teach/one observe is not widely recognized by educators as a viable co-teaching model because both teachers are not involved in the instructing of students. Teachers choose which model is appropriate based on their instructional goals, student needs**,** and the content being taught (Cook & Friend, 1995; Dieker & Murawski, 2003).

Table 3

Co-Teaching Models

Model	Definition	Visual Guide
One Teach/One Assist	One teacher provides the majority of the instruction while the other assists students. The teacher assisting may be keeping students on task, implementing behavior plans, or clerical duties.	x ooooo ooooo ooooo oooo x
Stations	The classroom is divided into groups with each teacher instructing a group. The students have the opportunity to rotate through the groups.	oo oo oo ox oo ox oo oo oo
Parallel Teaching	The students are divided into two groups. Each teacher is responsible for instructing one group. This model decreases the student-teacher ratio.	x x ooooo ooooo ooooo ooooo
Alternative Teaching	One teacher teaches the whole group while the other teacher instructs in an alternative location. Recommendations are to share responsibility and utilize flexible grouping.	x ooooo ooooo ooooo x oo oo
Team Teaching	Team teaching takes a collaborative effort from both teachers. Both teachers share the instruction. Trust is a major component.	xx ooooo ooooo ooooo ooooo

Note. Adapted from Barger-Anderson, Isherwood, & Merhaut, 2013; Zigmond & Magiera, 2001; Friend, 2008.

Co-Teaching Benefits

A significant benefit of the service delivery model of co-teaching is its ability to meet the requirements of the law to provide students with disabilities access to the least-restrictive environment. Co-teaching provides students in need of special education services access to general education grade-level curriculum with their peers and two educators supporting core instruction with real-world experiences (Barger-Anderson, Isherwood, & Merhaut, 2010; Friend 2008; Kloo & Zigmond, 2008; Murawski & Dieker, 2008). Other benefits for students in need of these services include increased self-esteem and confidence, enhanced academic performance, and improved peer relationships (Austin, 2001; Cramer & Nevin, 2006; Walther-Thomas, 1997).

General education students reported that they received more assistance from their teachers during instruction, fewer behavior problems, and they learned more (Hang & Rabren, 2009; Scruggs, Mastropieri, & McDuffe, 2007). According to Rea, McLaughlin and Walther-Thomas (2002), all students participating in an inclusive setting earned higher grades, achieved higher scores on standardized tests, had fewer behavior referrals, and had better school attendance.

The difficulty with determining the benefits of co-teaching is the tool used to define or determine success or benefit. A Hanover research report (2012) reported on a general lack of quantitative data on co-teaching with regard to outcomes involving student achievement. Research often reports on student or teacher perspectives and "how to do" or "what not to do" when implementing co-teaching, but the examination of the influence of co-teaching on student academic outcomes has been limited.

Cosier, Causton-Theoharis, and Theorharis (2013) examined the relationship of the time students with disabilities spent in general education to their performance on the Woodcock-

Johnson III Tests of Academic Achievement (WJ-III). The results indicated a significant relationship between hours in general-education classrooms, with a coefficient of .49 in reading and of .37 in math for students with disabilities aged six to nine. Significant gains were found with oral reading fluency (ORF) passages in the general-education setting when the passages were at their instructional level (Swanson & Vaughn, 2010). According to Walsh (2012), based on the Maryland School Assessment (MSA), students instructed in co-teaching classrooms from 2003 to 2009 had a 22% increase in proficiency level in math and reading for students in grades 3-8. Also indicated was that students in special education enjoyed school more, learned more, and felt better about themselves.

The lack of quantitative data is apparent according to Murawski and Deiker (2004) as they conducted a quantitative meta-analysis utilizing a comprehensive literature search through the ERIC, PsychLit, and Edinfor databases searching for all articles related to co-teaching. After analyzing the articles for specific criteria, only six were eligible for the meta-analysis, and they suggested an overall mean effect of 0.40, which suggests that co-teaching is a moderately effective service model for influencing student outcomes. In an analysis of 146 studies between 1990 and 2010, Solis, Vaughn, Swanson, and McCulley (2012) found the same lack of quantitative research, with only 15% of the studies yielding data on student outcomes or achievement.

Utilizing an experimental design, Tremblay (2013) compared co-teaching and solo-taught special education classrooms for students in first and second grade with learning disabilities with regard to academic achievement. The students with disabilities in the co-taught classrooms made progress in reading/writing from the beginning to the end of grade 1 and 2. The differences were

only statistically-significant in reading/writing for grade 1 not grade 2. There was no statistical difference in math for either grade, but the outcomes were still positive for math.

Co-Teaching Challenges

Along with the benefits of a service delivery model, there are always challenges. Isherwood, Barger-Anderson, Merhaut, and Katsafanas (2011) were able to identify areas of concern through interviews with teachers involved in their first year of co-teaching. The major concern of teachers was the lack of common planning time. They often found themselves planning "on the fly." Teacher compatibility and special education teachers not being familiar with the general education curriculum were issues with teachers, as well. Other factors that may add to the challenges of co-teaching are the need for administrative support and clarifying the roles and responsibilities of the educators (Friend, 2008). For co-teaching to be successful, it is recommended that teachers collaborate to help develop positive relationships (Noltemeyer & Sansosti, 2010). Co-teaching has the potential to improve student learning, but it may be more complicated than first believed (Friend, 2008). Using focus groups consisting of parents and students, Pivik, McComas, and LaFlamme (2002) identified four major challenges: (1) physical environment; (2) attitudes, such as bullying; (3) unintentional attitudes, such as lack of knowledge; and (4) physical limitations. Complaints from general-education and special-education teachers involved in co-teaching were lack of common planning time, scheduling issues, larger caseloads or classrooms, lack of training, and insufficient administrative support (Walther-Thomas, 1997). Even with the challenges that arise when providing co-teaching to students, it is still a valuable service delivery model.

Possible solutions to such challenges include: co-planning, clarifying roles and responsibilities, gaining administrative support, and training teachers (Friend, 2001; Friend,

2008; Isherwood et al., 2011). Effective inclusive schools focus on meeting the needs of all students with high-quality instruction utilizing resources effectively and efficiently while being flexible (McLeskey, Waldron, & Redd, 2014).

Resource Room

The Individual with Disabilities Education Act (IDEA, 2004) states that special education is not a place or a placement, but rather a service. It should be delivered in a regular-education setting except when the nature or severity of the child's disability is such that education in general-education classes, even with the use of supplementary aids and services, cannot be achieved. In such circumstances, the Individualized Education Plan (IEP) team may determine the need for an alternative curriculum within a resource room. A resource room may be the least restrictive environment (LRE) for a student to meet his or her level of need to achieve skills with an alternative or specialized curriculum (Watson, 2014). It is a place where students can come and go based on the area of academic need.

The teacher in a resource room is able to concentrate on specific skills of need and monitor student progress in acquiring those skills. The teacher also has the responsibility of planning and implementing individualized instruction to meet the student's needs, typically in the areas of reading or mathematics (Swanson & Vaughn, 2010).

The resource room can be considered for students when their individual needs cannot be met in a mainstream or co-teaching setting (Walther-Thomas, 1997). Some students' needs may only require them to go to the resource room to complete tests. These decisions are made by the IEP team using the IEP goals and objectives (Hall, 2007). The IEP goals and objectives constitute the learning curriculum, and time is spent with the special education teacher utilizing direct instruction with research-based reading or mathematics strategies (Hall, 2007). The

resource room is a place where students with special needs can become comfortable and secure and work at their individual instructional level (Bentum & Aaron, 2003). By receiving instruction in the resource room, students are able to experience academic success by completing work independently, which builds self-esteem. Typically, the resource room is a special setting where students receive over 50% of their instruction (Vannest, Hagen-Burke, Parker, & Soares, 2011). Of the approximately three million students with learning disabilities nationwide ages 6 to 21, 40% receive special education services outside the general-education classroom, spending between 21% and 60% of the day in a typical resource room (Swanson & Vaughn, 2010).

Within a co-teaching and resource room setting, special education teachers provide reading instruction with a direct link to the students' IEP goals decided upon at the students' IEP meeting. In the primary grades, a goal for oral reading fluency is typical within an IEP due to the correlation between reading fluently and comprehension (Samuels & Farstrup, 2011).

Oral Reading Fluency

The importance of Oral Reading Fluency (ORF) as part of the American reading curriculum dates back to colonial times (Samuels & Farstrup, 2006). ORF has gained and lost its importance as a major component of the reading process over the years before Congress asked the National Institute of Child Health and Human Development (NICHD) to develop a panel to evaluate existing research on the best ways to teach children to read. The National Reading Panel (2000) concluded that the best approach to reading instruction includes explicit instruction in phonemic awareness, systematic phonics instruction, methods to improve fluency, and ways to enhance comprehension. The panel (2000) identified five major areas of reading: 1) phonemic awareness, 2) alphabetic principle, 3) fluency, 4) vocabulary, and 5) comprehension. President George W. Bush's plan for improving education, No Child Left Behind (2001), included the

panel's findings, and ORF was placed in the spotlight. NCLB was recently reauthorized and renamed Every Student Succeeds Act (ESSA, 2015). The importance placed on research-based, evidence-based reading instruction continues within ESSA, and educators continue to address the combination of the five components of reading that were suggested by the National Reading Panel (2000), with the addition of writing. The five primary areas are:

1. Phonemic Awareness—the knowledge that words can be broken apart.
2. Alphabetic Principle—the knowledge that letters of the alphabet represent phonemes and these sounds are blended to form written words.
3. Fluency—the ability to recognize words easily and read with greater speed, accuracy, and expression.
4. Vocabulary—the understanding of new words in text or introducing new words.
5. Reading Comprehension—understanding what is read.

Oral reading fluency continues to be a central aspect of reading instruction in the elementary school because reading rate grows rapidly over the first several years of instruction (Hasbrouck & Tindal, 2006; Kim, 2015). Reading fluently is defined as recognizing words and reading them automatically, effortlessly, and efficiently with expression (Rasinski, 2003). Fluency has also been described as the bridge between phonics and comprehension (Pikulski & Chard, 2005). Good readers with adequate rate are able to process words effortlessly and can think more about what they read (LeBarge & Samuels, 1974; Paris, 2005). More recently, the research suggests that reading fluency has two major components related to adequate levels of comprehension: automaticity in word recognition and expression in oral reading (Kuhn, Schwanenflugel, & Meisinger, 2010). When words become automatic to readers, they are able to focus their attention on comprehending their meanings (Samuels & Fartsrup, 2011). Reading

rate is an aspect or indicator of reading fluency, and increased reading fluency is highly correlated to reading comprehension (Samuels & Farstrup, 2011). Reschly, Busch, Betts, Deno, and Long (2009) found an average correlation of .67 between reading rate and comprehension across studies in grades one through six. Burns, Kwoka, Lim, Crone, Haegele, Parker, Petersen, and Scholin (2011) found a moderate and significant correlation (r = .54) between ORF and percentage of comprehension questions answered correctly.

ORF is assessed by determining a student's reading rate by calculating the number of words read correctly per minute (WCPM) (Rasinski, 2003). The table below represents student fluency norms based on WCPM for grades second and third.

Table 4

Students' Fluency Norms Based on Words Correct Per Minute (WCPM)

Grade	Fall	Winter	Spring
2	50	84	100
3	83	97	112

Note. Adapted from Hasbrouck & Tindal, 2017

The accuracy of words per minute (WPM) can be assessed by dividing the number of words correct by the total amount of reading time (Mather & Goldstein, 2001). Oral reading assesses students' development of word recognition and fluency. Successful reading requires a certain level of accuracy. The table below depicts word recognition in relation to reading levels as determined by the decoding errors subtracted from 100 to calculate the percentage range (Rasinski, 2003).

Table 5

Word Recognition Accuracy to Reading Levels

Level	Accuracy (%)	Description
Independent	96-100	Read text without assistance
Instructional	90-95	Read text with assistance
Frustration	Below 90	Difficulty with text

Note. Adapted from Rasinski, 2003

Many questions arise over the amount of emphasis placed on ORF as a predictor for standardized test scores or as a risk factor for tiered instruction. According to Catts and Hogan (2003), ORF has been demonstrated to be necessary but not sufficient for skilled reading comprehension. In general, given the high level of comprehension skill related to standardized assessments, comprehension data along with ORF are recommended to predict outcomes (Shapiro, Solari, & Petscher, 2008). Friend and Hurley-Chamberlain (2010) reminded us that the use of high-stakes testing to determine student achievement is too broad a measure of progress of students with learning disabilities. Measuring ORF utilizing a one-minute probe is a quick and easy way to possibly identify problems with a student's comprehension and fluency by rating the number of words correct per minute (WCPM) or word accuracy to assess the child's reading level (Rasinski, 2003). A significant gap between a student's current WCPM and the expected WCPM per grade can assist teachers to identify a need for individualized strategies for student progress (Rasinski, 2003).

Fuchs et al. (2001) suggested that the relationship between ORF and comprehension is stronger when students are younger, and the relationship weakens as reading ability moves to more complex reading processes. Therefore, students who are disfluent in the primary grades are not automatic in word recognition and spend time on the task of decoding words that they lack

understanding of and so read more slowly (Samuels & Farstrup, 2011). Learning to read is an indicator of school success (Ramey & Ramey, 2004). Approximately 70 percent of children who are poor readers in third grade remain so in high school (Francis, Shaywitz, Stuebging, Shaywitz, & Fletcher, 1996; Shaywitz, 2003). Students who struggle with the many components of reading, including ORF, are often identified as having a learning disability and in need of special education services. Absence of reading fluency has long been considered a common characteristic of students with disabilities (Welsch, 2006).

Summary

The abundance of special education services that are available to students could be considered pieces of a puzzle due to the complexity of identifying a student with a disability, determining the most appropriate education according to IDEA (2004), and educating the student to the maximum extent possible with appropriate supplemental aids and services. Providing more research on effective delivery models of instruction is paramount to assist individualized education plan (IEP) teams to make informed decisions for a student with special needs.

The research on the effectiveness of the co-teaching model depends on which tool is utilized to measure the achievement, and as such, many researchers could not credit either service delivery model as attaining increased achievement (Herriott, 2010; Moody, Vaughn, Hughes, & Fisher, 2000; Mote, 2010). With increased accountability for student progress, Vaughn and Swanson (2015) suggested that research should continue with an emphasis on determining the success of interventions for students who have not responded to instruction. The lack of student success with interventions may often be the case with primary students in grades two and three, and educators must proceed with caution when making programming decisions; therefore, educators should heed Vaughn and Swanson's (2015) suggestion to include research

that develops reliable and valid progress monitoring tools to help identify the best academic treatment for students with disabilities. In the primary grades, identifying the best academic treatment can be accomplished by setting weekly and bi-weekly goals and measuring progress through ORF measures. Yet, many questions remain about the appropriate use and selection of delivery models currently used in school districts across the United States (i.e., co-teaching and resource rooms) to best help students meet annual yearly goals for ORF.

CHAPTER 3

METHODOLOGY

The purpose of the present study is to examine the relationship between educational environment (i.e. co-teaching and resource room) for second and third grade students with disabilities and academic growth on ORF measures, and compare the academic growth utilizing ORF measures of students with disabilities when receiving services in a co-taught classroom versus receiving services in a resource classroom. The study will also examine possible unique predictors of ORF. The unit of analysis will be Oral Reading Fluency (ORF) scores collected over a four-year period. Performance on ORF measures was collected through Dynamic Indicators of Basic Early Literacy Skills (DIBELS) testing. The research is timely because the co-teaching service delivery model has gained popularity with school districts across the United States in recent years. This increase has been due to attempts to become compliant with the Individuals with Disability Education Act (IDEA, 2004) mandates to provide service in the Least Restrictive Environment (LRE). However, many schools continue to use the resource room delivery model as it provides timely individualized instruction to those students who need special education services.

In total, this chapter provides the details of the study's methods. The methodology includes: (a) statement of the problem (b) research questions (c) the appropriate research design, (d) population and sample (d) the instrument utilized for data collection, with validity and reliability (e) procedures for data collection and (f) data analysis approach. The purpose of the research is to examine the achievement of students with disabilities with placement in a co-taught classroom versus a resource room placement.

Statement of the Problem

With the reauthorization of IDEA (2004) and several court cases clarifying and defining the LRE for students with disabilities, service delivery model effectiveness has been a centerpiece of policy-related research. In 2016-2017, 16.5% of Pennsylvanian students were identified in need of some type of special education service. Each student has an Individual Education Plan (IEP) meeting and teams are accountable for making decisions that will meet students' academic needs, allow them to make progress, and comply to LRE mandates. Terminology within the law, such as "good faith effort," "to the maximum extent possible," and "as deemed appropriate," has raised questions about the decision-making process. The magnitude of the decisions the IEP teams make for students in the primary grades is significant because these decisions may determine, or limit, students' future success, and so it is important that the decisions are based on solid research

School districts in Pennsylvania are held accountable for the decisions made for children with disabilities through Special Education Monitoring Compliance (PDE, n.d.). The Bureau of Special Education (BSE) developed administrative procedures to monitor district programs and compliance, and evaluate the appropriateness, effectiveness, and accountability of special-education services and programs. With LEA accountability to educational policy and providing a least restrictive environment for the increasing number of students needing some type of special education service or program, educators must make decisions based on individual need and solid research for students. The research will answer the following questions:

1. What academic growth, if any, do second and third grade students with disabilities make with grade-level reading curriculum with the co-teaching delivery model or the adapted delivery model in the resource room?

2. What are the unique predictors of Oral Reading Fluency(ORF) among second and third grade students with disabilities who receive services within a co-teaching classroom compared to receiving services within a resource classroom?

Research Design

The research design is a longitudinal, non-experimental causal comparative quantitative study comparing reading achievement of students in a co-taught classroom compared to students in a resource room. The researcher analyzed student academic growth utilizing the Dynamic Indicators of Basic Early Literacy Skills (DIBELS), Oral Reading Fluency (ORF). The researcher utilized a multiple regression model and descriptive statistics to analyze existing data based on student ORF growth and disability, amount of educational support, amount of time spent in an educational environment, and gender.

Non-experimental causal comparative studies attempt to determine the cause of an existing difference in groups (Fraenkel, Wallen, & Hyun, 1993). This research design was chosen because the researcher has no control of the placement of the students into groups. Students were already placed into co-taught classrooms or pull-out resource rooms for reading instruction based on the recommendations of their IEP team, therefore the groups are pre-existing and considered ex post facto. Reading achievement as defined as the students' increase in data from a pre- and post-test design utilizing the universal screening tool, DIBELS. The students' reading achievement will be analyzed over multiple years for individual students in second and third grades receiving special education services. Data will be gathered over the following four academic years: 2013-2014, 2014-2015, 2015-2016, and 2016-2017.

Population and Sample

School District 1 (SD1) is a large district covering a large geographic area, approximately 437 square miles, servicing thirteen small communities. The district has two seven through twelfth-grade high schools and five elementary buildings. In 2016-2017, SD1 consisted of 5,326 students with 17.6% of the students enrolled in special education services (Pennsylvania State Data Center). School District 2 (SD2) is a smaller school district consisting of 1,278 students in grades kindergarten through twelfth with 18.2% of the students enrolled in special education services for 2016-2017 (Pennsylvania State Data Center). SD2 has one high school, one middle school and one elementary and covers approximately 70 square miles, servicing students from five different rural communities. Both school districts provide co-teaching and resource room as service delivery models. Both districts provide co-planning, co-instruction and co-assessing, and teacher choice of which model is appropriate, based on their instructional goals, student needs**,** and the academic content.

The data were retrieved from second and third grade students who received special education services (N = 336) during 2013-2014, 2014-2015, 2015-2016, and 2016-2017. If the school district agreed to provide the researcher with student data for second and third grade students who receive special education services, the student was automatically included in the research. The number of students involved in the research was at the mercy of the school districts' willingness to share student data. Students were already identified with a disability through the evaluation process and the service delivery model was already decided by the IEP teams. The researcher excluded students with a primary disability of speech and language impairment and students with disabilities receiving services in emotional support, Life Skills Support, and Autistic Support classrooms. This exclusion of these students was due to the fact

that students receiving services with these supports typically do not gather ORF data thorough DIBELS.

Instrument Used for Data Collection

The instrument chosen for data collection was the DIBELS Next. The DIBELS Next is the 6th edition of the screening tool DIBELS. The DIBELS is an acronym for Dynamic Indicators of Basic Early Literacy Skills and was originally developed to represent the big ideas of reading: phonemic awareness, phonics, fluency, vocabulary, and comprehension (Hall, 2006). The purpose of the DIBELS is to predict future success with early reading literacy skills and determine grade level reading success (Hall, 2006). The DIBELS is also designed as a screening tool with benchmarks set for Fall, Winter, and Spring which lends itself to the pre- and post-test design. The DIBELS Next included additional evaluations of Whole Words Read (WWR), DIBELS Oral Reading Fluency with Retell (DORF), and DIBELS Composite scores. DIBELS Next utilizes six measures to assess early reading literacy. The First Sound Fluency (FSF) is where a student listens to a word from the proctor and states the first sound for each word. The Letter Naming Fluency (LNF) is where the student is provided a sheet of paper with letters and asked to name the letters within a minute. Phoneme Segmentation Fluency (PSF) is when the student is presented with a word and the student must state each individual sound of the word. Nonsense Word Fluency (NWF) is when the student is presented with a sheet that has consonant-vowel or consonant-vowel-consonant nonsense words. The students are asked to read the sounds and the whole nonsense word. NWF is divided into two subtests. The subtests include Correct Letter Sounds (CLS), which is when the proctor counts the number of sounds the student produces when reading nonsense words and the Whole Words Read (WWR), which is evaluated by the number of nonsense words read without saying individual sounds (e.g. *tig, wib, og*).

DIBELS Oral Reading Fluency (DORF) is when the student is presented with a reading passage, asked to read aloud, then retell what was read. The Daze is a more advanced assessment when the student is presented with a passage with words that are replaced with multiple choice words. The student reads silently and determines the correct word that best fits the meaning.

DIBELS Next is a criterion-referenced test that became available in the spring of 2010. Concurrent and predictive criterion-related validity of DIBELS Next was determined by the correlation between the DIBELS Next Composite Scores and the Group Reading Assessment and Diagnostic Evaluation (GRADE) (Williams, 2001) completed in 2009-2010. With a correlation of 1.0 being the strongest correlation, DIBELS Next Composite Score for predictive validity for first grade was 0.71 and 0.80 for second grade. The concurrent validity for first grade was 0.77 and 0.75 for second grade (Dewey, Powell-Smith, Good, & Kaminski, 2015). Reliability of DIBELS Next was determined by utilizing alternate form and test-retest reliability with all measures given within a two-week time period (Dewey et. al., 2015). DIBELS Next composite scores with the Single-Form and Alternate-Form reliability for first grade is 0.95 and 0.92 for second grade. The single form test-retest is 0.94 for first grade and 0.81 for second grade. (Dewey et al., 2015).

According to Wierma and Jus (2005), results are internally reliable if methods of implementation are consistent. Training for the implementation of the DIBELS Next was consistent with all teachers in SD 1 and SD 2, therefore all testing sessions were uniform and steps to analyze the data were the same across the districts. In SD 1, general education teachers were trained and tested their students. In SD 2, the Title 1 teachers were trained and complete the testing with all students. The completion of the DIBELS Next for both school districts was completed Fall, Winter, and Spring. Internal validity is understood when results can be

interpreted with confidence and occurs when control and procedures are followed (Wiersma & Jurs, 2005). DIBELS Next training was completed for both school districts at the Intermediate Unit 28 and was consistent with the analyzing and interpretation of the results. Internal validity can have eight major threats, such as history, maturation, testing statistical regression, instrumentation, selection, selection-maturation, and mortality (Wiersma & Jurs, 2005). History can be controlled by providing consistent days for testing across the district. Because the researcher is analyzing data across a year, maturation of students could affect the results. However, typically students in both second and third grades go through the same natural changes throughout a year according to Piaget's (1958) stages of child development. Past research supports the assumption that students that test and retest may perform better or regress. The DIBELS Next is designed to provide passages that were unpracticed for all second and third grade students. Mortality may cause a threat when conducting research, but typically, second and third graders who are receiving special education services do not exit the programs so quickly, once identified.

External validity may be compromised due to the population of the current students. The school districts included in the research study may not be representative of other populations in school districts across the United States; yet, the sample for this study is representative of students in rural areas.

Data Collection

The data collected for this study consisted of DIBELS Next Oral Reading Fluency scores. Data collection is the process of organizing information in a way that can be analyzed and provide information to make valid decisions about the research problem being studied (Wiersma & Jurs, 2005). The data collection instrument used for the research was Dynamic Indicators of

Basic Early Literacy Skills for Reading in the 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years administered by school districts to second and third grade students with disabilities.

The collection methods were as follows:

1. The researcher requested permission from school districts to grant access to second and third grade students with disabilities archived data for 2013-2014, 2014-2015, 2015-2016, 2016-2017. Data requested were ORF beginning and end of the year, gender, disability, amount of educational support, and amount of time spent in an educational environment (i.e. co-teaching or resource room).
2. The IRB was contacted for consideration of a study utilizing archived student data.
3. The districts that granted permission provided the researcher with access to student IEPs and DIBELS data or provided the researcher with ORF beginning and end of the year, gender, disability, and placement in a co-taught or resource room.
4. If the district did not provide the requested information, the researcher gathered student placement data from the students' IEPs. The students' placements in co-taught or resource room was found in Section VII Educational Environment and Section VIII Penn Data. The students' gender, grade, and disability were located on district special education rosters.
5. The researcher gathered ORF beginning of the year and end of the year data from section two, present levels of the IEP or the DIBELS website.
6. Data from 2013-2014, 2014-2015, 2015-2016, and 2016-2017 years were prepared and organized for second and third grade students with disabilities.

7. Data were entered into the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel, and information was interpreted, analyzed, and reported utilizing descriptive measures and multiple regression.

Data Analysis

Data analysis consisted of descriptive statistics along with multiple regression in regard to groups of 2nd and 3rd grade students with disabilities in 2013-2014, 2014-2015, 2015-2016, and 2016-2017. Descriptive statistics provide a meaningful summary of the underlying phenomenon (Wheelen, 2013). Although descriptive statistics can provide us with a summary of data, the researcher must caution the overreliance and misleading conclusions that could be implied; therefore, multiple regression was utilized to analyze the data to make meaningful associations.

Multiple regression analysis is a statistical tool that helps researchers with the challenges of many variations of data that may affect relationships (Wheelen, 2013). Multiple regression allows researchers to quantify a relationship between a particular variable and an outcome such as student achievement as a result of co-teaching or placement in a resource room model. Because of the many possible variables that could affect achievement within co-teaching or a resource room, multiple regression analysis provided educators with the results needed to confirm or deny a relationship between the service delivery model and student outcome measured with ORF.

Summary

Chapter 3 focused on a review of the longitudinal causal comparative study conducted in rural school districts. The researcher examined the effectiveness of the service delivery models, co-teaching and resource room, with regard to reading achievement for students who are

receiving special education services in second and third grade. The students received services over a four-year span beginning with 2013-2014 and ending with 2016 - 2017. The instrument utilized to gather student data was the DIBELS Next. After data were compiled, the data were analyzed utilizing descriptive measures and a multiple regression utilizing the SPSS database and Microsoft Excel.

CHAPTER 4

DATA AND ANALYSIS

The purpose of this non-experimental causal comparative study was to examine the relationship between educational environment for second and third grade students identified with disabilities (i.e., students with LD, OHI, ID, SLD, and EBD), and academic growth on measures of oral reading fluency (ORF). A secondary objective was to explore the unique predictors of ORF, while controlling for other explanatory factors of students' reading growth (e.g., amount of time in the regular education classroom, type of disability, and grade-level) among students with disabilities.

In response to increased accountability and mandates for providing students with disabilities an education in the least restrictive environment (LRE) (IDEA, 2004), Pennsylvania educators provide students in need of special education the most effective education on the basis of the continuum of service delivery models available for instruction. Educational terms within policy and laws such as "good faith effort" and "as deemed appropriate" has added to the complex process that educators and families have to understand to make good educational decisions for students. It is important to add empirical data to either support or counter the effectiveness of service delivery models to assist educators and families through this complex process. Decisions made during IEP meetings with regard to educational environment may affect a child's education and school career (Hallenbeck, Kauffman & Lloyd 1993; Griffin, 2011). This chapter presents the description of the sample, the summary of results, the details of analysis and results, and conclusion.

Description of Sample

Archived data for this study were derived from a sample population that consisted of 336 second and third grade students with disabilities in rural school districts in Western Pennsylvania over a four-year time span of 2013-2014, 2014-2015, 2015-2016, and 2016-2017. All students with disabilities enrolled in second or third grade of the participating districts during the four-year timespan were included in the sample population with the exception of students receiving services in an Emotional Support, Life Skills Support, or an Autistic Support setting. Before moving forward with this investigation, a priori power-analysis in G-power (Faul et al., 2007) was performed to estimate the sample size needed to detect an effect, and to estimate the size of the effect that might be detected with a particular sample size. Results from the analysis showed that a sample size of 100 students would be sufficient for detecting a meaningful effect with a sample.

The sample for this study contained 336 students. A total of 130 were female and 206 were male. The average ages of students were between seven and nine years-old. All 336 students were already identified as a student with a disability and the education environment was decided by the IEP team. For educational environment, 163 students participated in the co-teaching service delivery model for reading instruction, and 173 students participated in the resource room service delivery model for reading instruction. Table 6 provides an overview of students' identified disabilities and breakdown across disability categories.

Table 6

Disability Category and Number of Students Represented

Identified Disability		N = students	
	N	Co-Teaching	Resource Room
Specific Learning Disability: SLD	143	71	72
SLD/Speech and Language Disability: SLD/SLI	83	36	47
Other Health Impairment: OHI	34	20	14
OHI/SLI	38	20	18
Autism	3	2	1
AUT/SLI	20	11	9
Intellectually Disabled/SLI:	12	2	10
Emotionally Disturbed: ED	2	0	2
AUT/Mentally Gifted: AUT/MG	1	1	0

Summary of Results

This section will provide a brief summary of the results. Each research question will be stated followed by the results of the analysis. All of the research questions were addressed using a multi-linear regression and descriptive analyses. The analyses were performed using SPSS and Microsoft Excel.

Criterion Measure

One measure was selected to represent students' reading ability across the school-year. Oral reading fluency was defined as the number of words read correctly per minute on a grade-level reading probe. Teachers administered ORF probes three times per school year. Students

were provided with a grade-appropriate passage and asked to read aloud for one minute. The teacher marked words that are misread, skipped or the student hesitated for three seconds or longer. The passage was then scored by subtracting the number of errors by the number of words read in the passage within a minute. With DIBELS NEXT, students were provided with three passages to be scored by the teacher. The teacher then took the middle score as the ORF measure for WCPM for the student.

Predictor Measures

Five measures were included as potential predictors of students' ORF score. The first predictor variable was students' educational environment (i.e., co-taught, or resource room). The remaining predictor variables were gender, type of disability, amount of time spent receiving support, and amount of time in a general-education environment. Co-teaching and resource room were coded as 1 or 2, respectively. Students' gender were coded as a 1 for female, and a 2 for male. Type of disability was categorized into nine separate codes: (a) learning disability [LD], (b) learning disability/speech and language impairment [LD/SLI], (c) other health impairment [OHI], (d) other health impairment/speech and language impairment [OHI/SLI], (f) autism [A], (g) autism/speech and language impairment [A/SLI], (h) intellectually disabled/speech and language impairment [A/SLI], (i) emotionally disturbed [ED], (j) autism/mentally gifted [A/MG].

The amount of educational support was identified as three different levels of time: (a) Itinerant, 20% special education support or less of school day, (b) Supplemental, greater than 20%, less than 80% of special education support of school day, (c) Full Time, greater than 80% of special education support of a school day. The amount of time spent in educational environments was identified as three different percentages of time spent in a general education

setting: (a) inside regular classroom 80% of school day, (b) inside regular classroom 79-40% of school day, (c) inside regular classroom less than 40% of day.

Data Analysis

Prior to running the multiple linear regression, there were eight assumptions that the data must "pass" for regression analysis to provide valid results (Cohen, Cohen, West & Aiken, 2003). The first two assumptions were met as the dependent variable (ORF) used a ratio scale, and the analysis include two or more predictor variables that were continuous (i.e., used an interval or ratio scale) or categorical (i.e., used an ordinal or nominal scale). Next, the assumption of independence of observations (i.e., independence of residuals) was checked using the Durbin-Watson statistic (Cohen et al., 2003). The Durbin-Watson statistic was .192, which indicated that there was no correlation between residuals.

The assumption of linearity was tested in two parts: (a) a scatterplot of the studentized residuals against the (unstandardized) predicted values was created, using SPSS; and (b) the researcher established the existence of a linear relationship between the dependent variable and each of the independent variables using partial regression plots between each independent variable and the dependent variable (with categorical independent variables removed; e.g., gender). Fifth, the assumption of homoscedasticity was checked by plotting the studentized residuals against the unstandardized predicted values, which were produced as part of the multiple regression procedure. Visual inspection of the plot indicated that there was homoscedasticity.

Sixth, the assumption of multi-collinearity was checked. Multi-collinearity occurs when you have two or more independent variables that are highly correlated with each other. This leads to problems with understanding which independent variable contributes to the variance explained in the dependent variable, as well as technical issues in calculating a multiple

regression model (Cohen et al., 2003). Table 7 presents bivariate correlations among the predictor variables. Correlations ranged from .01 to .76 (service delivery model [co-teaching and resource room], and amount of time in educational environment). Therefore, to avoid violation of the assumption of collinearity with the multiple linear regression model, educational environment was dropped as a possible predictor variable due to the significant correlation with service delivery model (r = .76, p = .000). The remaining bivariate correlations were moderate to low, which helped to maximize the predictive power and interpretation of regression weights. Moreover, VIF scores for the remaining four predictor variables were less than 10 (with a tolerance recommendation of .10).

Table 7

Correlation Between Predictor Variables

		1	2	3	4
1. Environment/ SDM	Pearson Correlation	1	.011	.032	.232**
	Sig. (2-tailed)		.835	.558	.000
2. Gender	Pearson Correlation	.011	1	.004	.060
	Sig. (2-tailed)	.835		.938	.269
3. Disability	Pearson Correlation	.032	.004	1	-0.056
	Sig. (2-tailed)	.558	.938		.304
4. Support	Pearson Correlation	.232**	.060	-0.056	1
	Sig. (2-tailed)	.000	.296	.304	

** Correlation is significant at the 0.01 level (2-tailed)

Last, the final two assumptions (i.e., the presence of outliers, and normality of the distribution of residuals) were checked as follows. First, using SPSS, the measure of influence of data points was checked using Cook's Distance. The mean score for Cook's Distance was .003 (minimum = .000, and maximum = .043), indicating that none of the data points in the sample warranted further investigation (or might be influential on the overall mean of students' ORF scores). Second, the assumption of normality of the residuals were checked using a histogram with superimposed normal curve (see Figure 1 below). As demonstrated, the standardized residuals appear to be approximately normally distributed.

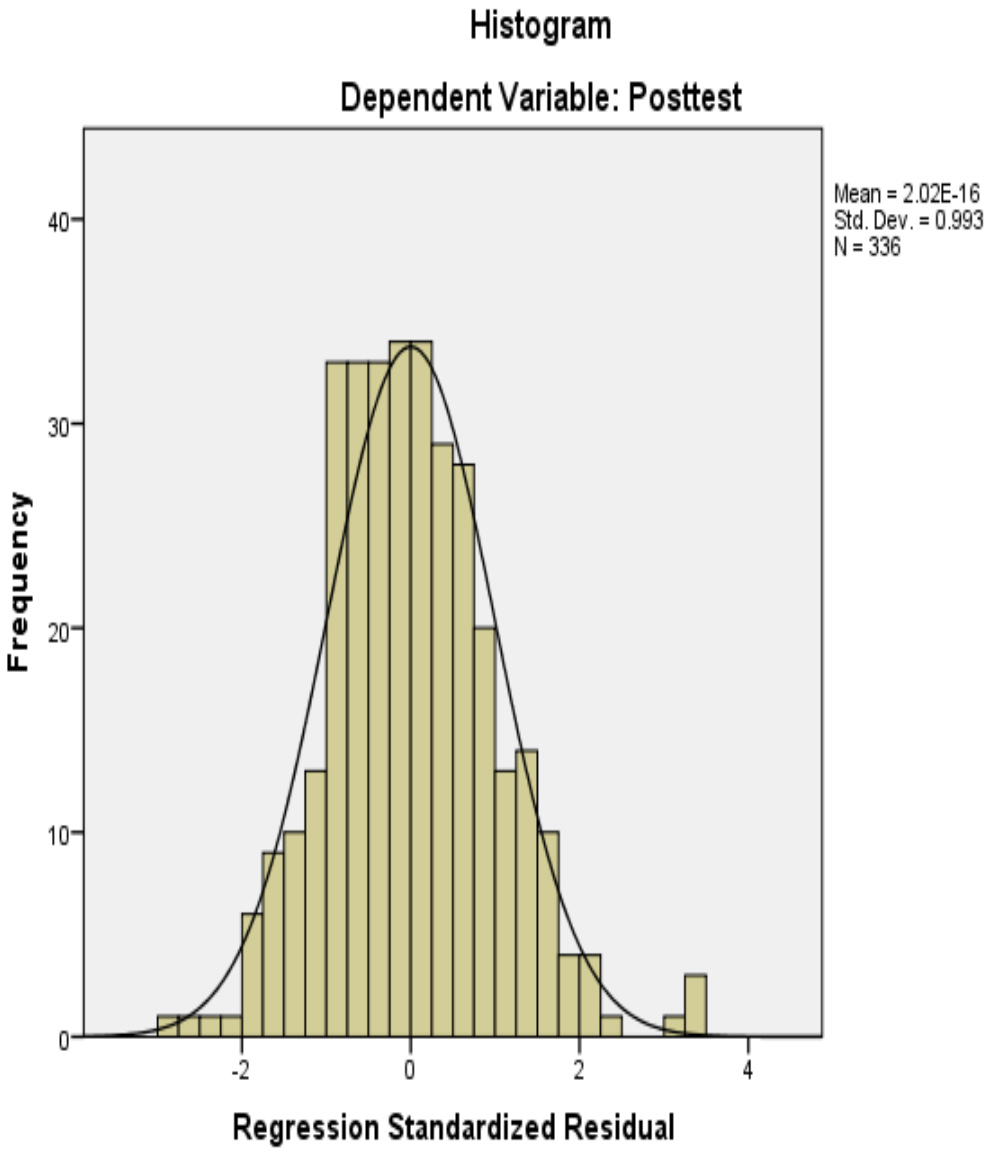

Figure 1. Histogram with superimposed normal curve.

To confirm the findings of visual analysis, a P-P Plot was created using SPSS (see Figure 2 below). As demonstrated, although the points are not aligned perfectly along the diagonal line, they are close enough to normal for the analysis to proceed (Cohen et al., 2003). As multiple regression analysis is fairly robust against deviations from normality, these findings suggest that

no transformations need to take place, and that the assumption of normality has not been violated.

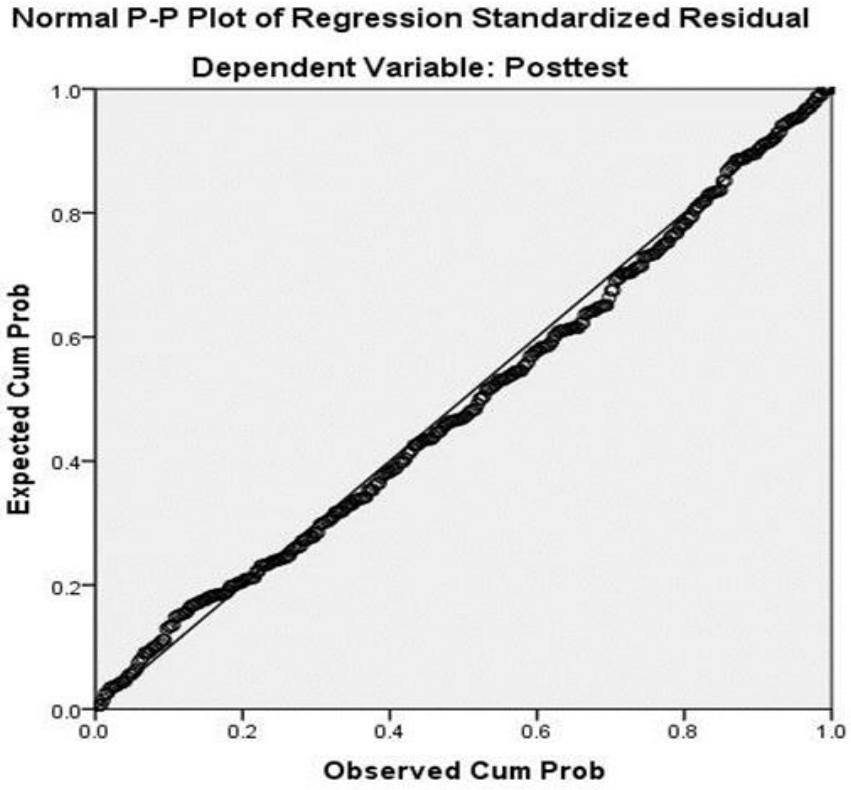

Figure 2. Normal P-P plot of regression standardized residuals.

Research Questions, Hypotheses, and Analysis

The following section will describe each research question, followed by procedures used in testing the hypothesis. Research question one was answered using paired sample t-tests and descriptive statistics, and research question two was answered with regression models.

Research question one: What academic growth, if any, do second and third grade students with disabilities make with grade-level reading curriculum with the co-teaching delivery model or the adapted delivery model in the resource room?

A paired sample t-test showed that the ORF scores of second and third grade students increased 25.01 words per minute, 95% CI [23.06, 26.95] across the school year, which was a statistically significant increase at the .05 level, $t(335) = 25.298$, $p = .000$. When descriptive procedures were applied to the criterion variable, ORF growth, the results are as follows for students receiving services in co-taught service delivery model. The mean is 31 WCPM. The range is 104 with the minimum of -13 and maximum of 91. The median is 31. The mode is 17. When descriptive procedures were applied to the criterion variable, ORF growth, the results are as follows for students receiving services in resource room as the service delivery model. The mean is 19 WCPM. The range is 89 WCPM with the minimum of -30 and the maximum of 59 WCPM. The median is 19. The mode is 13. Table 8 shown below describes the average ORF growth utilizing descriptive statistics for each model.

Over the four-year span data were culled for 336 participants with 163 assigned to a co-teaching environment and 173 participants assigned to a resource room environment. An independent-samples t-test was run to determine if there were differences on ORF average growth between second and third grade students receiving services in a co-taught classroom or a resource classroom for instruction. The average ORF growth for students receiving services in a co-taught classroom were higher (31.3 ±19.4) than students receiving services in a resource room (19.01 ± 14.42), a statistically significant difference of 0.000 (95% CI, 8.68 to 16.00), $t(334) = 6.63$, $p=.000$.

Second and third grade students with disabilities who received services in a co-taught classroom demonstrated more growth than second and third grade students with disabilities in a resource room (see Figure 3 below). In particular, second and third grade students with

disabilities made more ORF growth (N = 31) in the co-teaching classroom than the second and third grade students with disabilities in the resource room (N = 19).

Table 8

Average ORF Growth per Environment/Service Delivery Model (SDM)

					95% Confidence Interval for Mean	
	N	Mean	SD	SE	LB	UB
Co-teaching	163	31.36	19.46	1.52	28.35	34.73
Resource Room	173	19.01	14.42	1.09	16.85	21.18
Total	336	25.00	18.11	.98	23.06	26.95

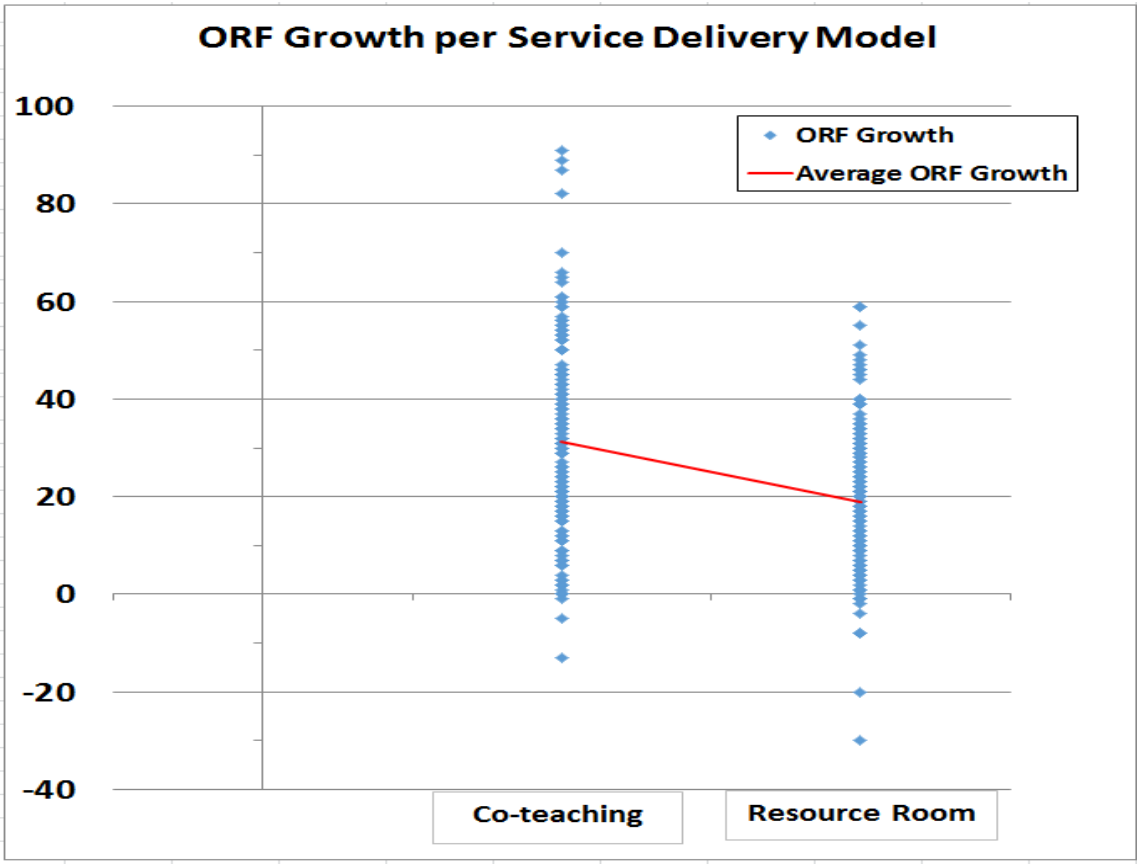

Figure 3. Oral reading fluency growth for each model of service delivery.

Research question two: What are the unique predictors of Oral Reading Fluency (ORF) among second and third grade students with disabilities who receive services within a co-teaching classroom compared to receiving services within a resource classroom?

A multiple linear regression was calculated to predict ORF among second and third grade students, based on service delivery model (i.e., co-teaching, or resource room), baseline ORF scores, gender, type of disability, and level of support. A significant regression equation was found ($F(335, 5) = 180.53$, p = .000, with an R^2 of .73. As expected, service delivery model had the most significant effect on students ORF scores (t = -6.03, p = .000), followed by students' ORF scores at baseline (t = 25.91, p = .000). Students' gender, type of disability, and the level of support received were not significant predictors of their ORF scores at the end of the school year.

On control for the other variables, students who participated in co-taught classrooms scored 12.05 points higher on ORF at the end of the school year than students in resource classrooms (*B* = -12.05, *p* = .000). Students' ORF at baseline was responsible for a 1.04 point increase in ORF at the end of the year, while controlling for gender,

Table 9

Multiple Linear Regression Predicting ORF Measures

Name of Variable	Unstandardized Coefficient	Std. Error	t	Standardized Coefficients Beta
BL	1.035	7.967	25.907	.789
Environment/ SDM	-12.046	.040	-6.033	.040
Gender	1.241	1.918	.647	.018
Disability	-7.05	.534	-1.322	-1.322
Support	2.302	3.459	.666	.020
R sq.	.732			
R-sq adj.	.728			
Model fit				

Summary

In Chapter 4, the researcher examined: (a) the effectiveness of educational environment on ORF measures, and (b) predictors of ORF for second and third grade students with disabilities. The data were collected from two rural school districts during 2013-2014, 2014-2015, 2015-2016, and 2016-2017 school years. The results indicated that students make more academic growth receiving services in a co-taught classroom versus receiving services in a

resource room. In short, evidence from the sample seems to indicate that students' educational environment (i.e., co-teaching or resource room) is a significant predictor for ORF growth among second and third grade students identified with disabilities, while holding constant their disability, level of support, and gender. In the next chapter, the researcher will discuss the implications of the findings, make connections to the literature, and provide recommendations for future research and policy in the field of education.

CHAPTER 5

DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Chapter 5 presents the discussions, implications, and recommendations from the current study. The purpose of this research study was to examine the relationship between educational environment for second and third grade students with disabilities and academic growth, as measured by ORF. The study also explored possible predictors of ORF growth for second and third grade students with disabilities, while controlling for other factors that may influence students' reading achievement. The study analyzed ORF from pre- to posttest on the DIBELS for second and third grade students with disabilities who were receiving instruction: (a) within a co-teaching classroom with the general curriculum, or (b) within a resource room with an alternative curriculum.

The purpose of the present chapter is to provide interpretations of the data analysis presented in Chapter 4. Chapter 5 is organized in the following format: (a) summary of the study; (b) discussion of the findings; (c) implications of the results; (d) recommendations for practice and future research; (d) limitations; and (e) conclusions.

Summary of the Study

As school systems attempt to provide students with disabilities services in the least restrictive environment, with appropriate supplemental aids and services, educators and parents are challenged with deciding the most effective service delivery model to meet individual student needs, while being held accountable to educational policy. As decisions about educational environment for students with disabilities are considered, ambiguous expectations related to academic growth further add to the complexity of the process. In total, evidence shows that the number of students in need of special education services is increasing nationwide (Samuels, 2016); therefore, it is in the interest of our students for administrators, educators, and parents to

make research-based decisions about the most effective environment for students to be educated. There is a lack of research targeting students with disabilities and the facilitation of academic achievement (as defined by standards for oral reading fluency) in one service delivery model over another, which might be used to assist teams in making informative decisions for educational environment (Murawski & Deiker, 2004; Solis, Vaughn, Swanson, & McCulley, 2012).

The present study was designed as a non-experimental, causal-comparative quantitative study to examine students' academic achievement in a co-taught classroom, or a resource classroom. The researcher analyzed archived ORF measures for second and third grade students with disabilities from 2013-2014, 2014-2015, 2015-2016, and 2016-2017 in order to identify predictors of student achievement (e.g., gender, type of disability, and educational supports) in either a co-teaching classroom or a resource classroom. The researcher also examined comparisons between each service delivery model and ORF scores to determine which model yielded more academic growth. In total, the researcher utilized descriptive statistics along with multiple linear regression models to determine effectiveness, possible relationships, and predictors of ORF scores for second and third grade students with disabilities.

The study sample included archived pre- and posttest ORF measures for 336 second and third grade students with disabilities. Students' ORF scores were included in the research if a randomly selected group of school districts were willing to provide the researcher with data. Finally, it's important to note that the students were already placed into a service delivery model for instruction by the students' IEP team, prior to the study. To address the underlying objectives of the study, the following two research questions were developed:

1. What academic growth, if any, do second and third grade students with disabilities make with grade-level reading curriculum with the co-teaching delivery model or the adapted delivery model in the resource room?
2. What are the unique predictors of Oral Reading Fluency (ORF) among second and third grade students with disabilities who receive services within a co-teaching classroom compared to receiving services within a resource classroom?

Discussion of the Findings

Several studies performed over the past five-years (see Cosier et al., 2013; Swanson & Vaughn, 2010; Tremblay, 2013; Walsh, 2012) have examined the relationship between educational environment and student achievement, utilizing different outcome measures. For example, Cosier et al. (2013) examined WJ-II (Woodcock Johnson test of Cognitive Ability), while Swanson and Vaughn (2010) examined ORF at student instructional levels. In addition, Tremblay (2013) examined the impact of environment on students' grades, while Walsh (2012) examined the effects of environment on the Maryland School Assessment (MSA). While educational environment seemed to influence outcomes in the abovementioned studies, the results were inconsistent; therefore, more work is needed to better understand the relationship between environment and academic outcomes. The outcome measure in this study is ORF growth, utilizing pre- (or baseline scores) and posttest data on the DIBELS assessment. The outcome measure was examined to determine the possible relationship between educational environment and student achievement, the impact of educational environment (i.e., co-teaching and resource room) and possible factors that predict ORF growth for second and third grade students with disabilities.

Research question one:

What academic growth, if any, do second and third grade students with disabilities make with grade-level reading curriculum with the co-teaching delivery model or with the delivery model in the resource room?

After analyzing the data, the findings resulting from research question one indicated that students who receive instruction in a co-teaching classroom, as well as, a resource room with an alternative curriculum make academic growth with ORF measures. Second and third grade students with disabilities receiving services in a co-teaching classroom make more academic growth on ORF measures (M = 31) than students receiving instruction in a resource room (M = 19). These findings are consistent with those reported in the literature with elementary ORF measures (Swanson & Vaughn, 2010); however, to the researcher's knowledge, this study is the first one to look at the influence of educational environment on ORF among students in second and third grade, in a rural school district. At the same time, the findings do not support the researcher's prediction that second and third grade students with disabilities who receive services in a resource room would outperform those who receive services in a co-taught room. This hypothesis was based on past research that students in a resource room are provided with more individualized, academic-specific instruction leading to better outcomes than general education classrooms (Carlberg & Kavale, 1980; Leinhardt & Pallay, 1982; Sidelar & Deno, 1978).

Research question two:

What are the unique predictors of Oral Reading Fluency (ORF) among second and third grade students with disabilities who receive services within a co-teaching classroom compared to receiving services within a resource classroom?

The researcher examined six potential predictors of students' ORF scores. The potential predictors were student's educational environment (i.e. co-taught, or resource room), gender, type of disability, amount of time receiving support and the amount of time in a specific environment. To avoid violation of the assumption of collinearity with the multiple linear regression model and maximize the predictive power of the regression weights, the amount of time in a specific environment was dropped as a predictor variable.

After analyzing the data, the findings resulting from research question two indicate that educational environment (or what is referred to as service delivery model [PDE, 2016]) is a significant predictor of ORF growth for second and third grade, among students with disabilities. The relationship between ORF at baseline and ORF at posttest was also significant. Put differently, student's incoming ORF was a significant predictor of their ORF at posttest. Together, the six predictor variables in the model accounted for 73% of the variance in ORF scores among the sample, which is extremely high within research in the social sciences (Hair, Anderson, Tatham, & Black, 1998). Moreover, the results indicated that students who participate in a co-taught classroom will – on average - score 12 words higher on ORF measures than students in a resource room. These findings on the relationship between student achievement in reading and educational environment is consistent with those reported in the literature (Cosier et.al. 2013).

The findings also indicated that gender, the amount of special education support, and the child's disability do not have a significant impact on student outcomes as measured by ORF. Educators would expect a child's disability and the amount of special education support to be significant in determining increased academic growth. In fact, research over the past two decades has shown that a child's disability can have a significant impact on their academic

outcomes (Waya, Vanzile-Tamsen, Black, Billiot, & Tovar, 2015; Young, Beitchman, Johnson, Douglas, Atkinson, Escobar, & Wilson, 2002). The results of this study, however, show that a students' educational environment is more important than his/her disability on ORF scores. When examining the two theoretical frameworks presented in Chapter 1, these results seem to indicate that Bronfenbrenner's ecological systems theory (1979) may have more of an influence on the current study and student outcomes. In particular, Bronfenbrenner's theory proposed that human development is affected by everything around them and attempts to explain how interactions in their lives affect their learning. The many systems in their lives influence and impact one another. The findings support the environment as a significant predictor for academic growth with co-teaching showing more academic growth. Students in a co-teaching classroom have access to the general education curriculum and interactions with nondisabled peers, which according to the ecological systems theory have an effect on how a student learns.

Implications of the Results

The results of this study provide several implications for educators, parents, and students. The first important implication is how valuable the results are to IEP teams when planning for appropriate educational environments to meet the needs of students with disabilities. The results of the study support a co-teaching setting as the more effective placement for students to achieve ORF growth regardless of the disability. The results diminish the importance of a child's disability when planning to meet the educational needs of a student. Secondly, the results support educational policy and LRE mandate under the reauthorization of IDEA (2004). The mandate states:

> To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, 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. (IDEA, 2004, PL-108-446, Section 300.114(a)(2))

As IEP teams plan, administrators, teachers, and parents are required to provide the LRE as a continuum of services for students with disabilities with appropriate supplemental aids and services. The results of the study imply that the discussion of the LRE continuum of services begins with the consideration of a co-teaching environment, then move towards more restrictive settings, such as a resource room.

A third implication of the results is co-teaching is a more effective service delivery model, district leaders and administrators should provide educators with the resources to provide appropriate supplementary aids and services in the LRE. When decisions for staffing and building resources are being made, administrators and teachers should be provided with the resources to provide a variety of service delivery models to meet the needs of all students in the LRE with supplementary aids and services, regardless of the financial restraints that may arise. Friend (2008) identified the lack of administrative support as a challenge for successful implementation of co-teaching as a viable service delivery model. This study supports the relationship between educational environment and student achievement with ORF growth in a co-teaching setting and administrative support is paramount to its success.

The fourth implication of the results is special education teachers and general education teachers need to believe that students can be supported and make academic progress in the general education setting with accommodations. As part of the IEP team, educators tend to lean

on the side of caution and consider one specific delivery model for instruction instead of a continuum of services. Placement decisions should continue to be made by determining if the service delivery model or placement will provide the instructional strategies for the student to achieve his or her IEP goals (Zigmond, 2003).

Recommendations for Future Research

According to Friend, Cook, Hurley-Chamberlin, and Shamberger (2010), the future of co-teaching may be dependent on increasing the quantity and quality of the research. Research on the effectiveness of co-teaching is challenging due to the difficulty with implementing grade level services with fidelity, the number of variables that could potentially affect the outcomes and the rigor of the methodology with conducting experimental or quasi experimental research (Friend et. al., 2010). Even with these challenges of conducting quality quantitative research on the effectiveness of co-teaching on student achievement, there continues to be a need for more research on student outcomes or predictors of student improved outcomes for students with disabilities. Inclusion is not going away in the 21st century (Barger-Anderson et al., 2013), inclusion is only going to be enhanced with education policy being molded by special education law and court cases representing students with disabilities. With educators being accountable for upholding policies, educators need to be informed with new research to support decisions as the team provides appropriate services for students with disabilities along the continuum of LRE.

As the field of education attempts to meet students' academic needs and close the achievement gap, educators need to continue to make a connection between research and practice. The current study can and should be replicated with a larger sample population utilizing multiple linear regression analysis to combat the challenges described by Friend et. al. (2010) challenges. The regression model is a tool that can isolate the effect of one variable while

holding other variables constant (Whelen, 2013). The model can quantify relationships between particular variables and an outcome that we care about while controlling for other variables. The possibilities are endless for future research. Researchers could determine the relationship between service delivery models, if any, to reading levels, Pennsylvania System of School Assessment (PSSA) scores, Pennsylvania Value-Added Assessment System (PVAAS) growth, student grades, or instructional reading levels. A barrier to replicating the study with a larger sample population is school districts' willingness to share student data or grant permission for researchers to review student records. Other possible predictors could be explored, such as, types of curriculum implemented, socio-economic status of students, or teacher experience based on number of years.

Another suggestion for future research is to replicate the study with an urban or suburban school to observe the possible predictors or outcomes. A qualitative piece could also be added to the study with observations of the co-teaching and resource classrooms describing the number of students, types of resources, number of grade-levels, and teacher-student ratio.

Limitations

The limitation section will focus on three primary limitations to the study that were realized before data was collected. These limitations are important because they provide the reader with an understanding of the findings and a reminder that results can be generalized the results, but proceed with caution and not over generalize the results. The three limitations are teacher quality, the sample of students, and finding districts that provide both models for instruction and are willing to provide the researcher with the archived data.

The first limitation that should be addressed is teacher quality. The teacher's quality and experience may influence student outcomes; however, it does not discredit the results of the

findings for the current study. According to the Pennsylvania Department of Education's most recent reporting on teacher evaluations, 105,514 teachers were evaluated in 2013-2014 and 105,344 were rated satisfactory (PDE, n.d.). Of the 500 school districts in PA 235 are considered rural and 99.8% of the teachers had a rating of proficient (PDE, n.d.).

The second limitation of the study was sample of students. At the primary levels, school districts attempt to provide students with interventions before moving to an evaluation, therefore, the number of students identified in second and third grade with a disability may be limited. The researcher was able to gather archived data for 336 (N = 336) students. Results from a priori power-analysis in G-power (Faul et al., 2007) showed that a sample size of 100 students would be sufficient for detecting a meaningful effect with a sample. The limitation of sample size no longer posed as a threat.

The third limitation was locating districts that offered both service delivery models of co-teaching and resource room for second and third grade students with disabilities. The larger issue became the number of districts that were reluctant to share their data with the researcher. The researcher contacted several school districts in hopes to include their archived students' data on ORF growth. Districts were not willing to provide the researcher with the data or provide the researcher with access to their records to locate the data. This reluctance limited the participating districts to two rural school districts; however, 47% of the school districts in Pennsylvania are considered rural (PDE, n.d.). Therefore, the results could be generalized to other rural school districts in Pennsylvania.

The limitations to the study are important to note to understand the study and generalize the results and findings to the general population of students with disabilities. The limitations are the result of the overall education system and cannot be avoided. Although the teacher

quality, sample size and the districts participating were not ideal, the findings of the present work have implications to educational policy and decision making at the state and federal levels. Moreover, the results can be generalized to second and third grade students with disabilities in rural school districts in Western Pennsylvania.

Summary

The purpose of the study was to: (a) examine the relationship between educational environment (i.e. co-teaching and resource room) for second and third grade students with disabilities and academic growth on ORF measures, (b) determine the effectiveness of service delivery models, and (c) identify possible predictors of ORF, while controlling for other factors for student reading growth. Although results of the study did not support the researcher's hypotheses, several findings were significant and should be shared with other educators. The study is additional quantitative research to add to the literature on achievement of students with disabilities in service-delivery models for reading instruction.

The quantitative results indicate that there is a significant relationship between educational environment (i.e., co-teaching and resource room) and ORF measures. The data indicate that the educational environment or service delivery model had the most significant effect on students' ORF scores. Students' gender, type of disability, and the level of support received were not significant predictors of their ORF scores at the end of the school year. Students who participated in co-taught classrooms scored 12 points higher on ORF at the end of the school year than students in resource classrooms. It is important to note that the predictor variables account for 73% of variance in ORF scores among the sample.

The present study provides IEP teams with quantitative data to support educational policy and LRE mandates which affect IEP decision making with regard to educational placement for primary students with disabilities.

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