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An Examination of the Relationship Between the Achievement of Students with High Incidence Disabilities and Maine State Compliant Standards-Based Individualized Educational Programs

Jessica A. Yates CAS, MS
University of Southern Maine, Muskie School of Public Service, jessica.yates@maine.edu

AN EXAMINATION OF THE RELATIONSHIP BETWEEN THE ACHIEVEMENT OF STUDENTS WITH HIGH INCIDENCE DISABILITIES AND MAINE STATE COMPLIANT STANDARDS-BASED INDIVIDUALIZED EDUCATIONAL PROGRAMS

By

Jessica A. Yates

B.S. Bowdoin College, 2000

M.S. University of Maine, 2002

C.A.S. University of Southern Maine, 2012

A DISSERTATION

Submitted in Partial Fulfillment of the

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Advisory Committee:

Dr. Catherine Fallona, Professor of Education and Human Development, Advisor

Dr. Joseph Capelluti, Professor of Educational Leadership

Dr. Garry Wickerd, Assistant Professor of Educational and School Psychology

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Joseph Capelluti, Member

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Dissertation Advisor: Dr. Catherine Fallona

An Abstract of the Dissertation Presented
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This quantitative study analyzed the significance of the impact of Maine state compliant standards-based individualized education programs (IEPs) on the math and reading achievement of third grade students eligible for special education under the high incidence disability categories of Specific Learning Disability and Other Health Impairment. A total of 72 cases ($n = 72$) were collected. Descriptive data analysis was conducted to investigate characteristics of IEP compliance with Maine state standards-based IEP expectations in the academic and standards-based IEP goal realms. Analyses of Covariance were conducted to determine if the compliance level of a student's standards-based IEP had a significant impact on the student's achievement in math and reading, respectively, as measured by his or her growth target attainment on the Northwest Evaluation Association Measures of Academic Progress (NWEA MAP) assessment, while controlling for the covariates of student disability and least restrictive environment percentage.

Results indicated a significant difference in student reading achievement between the different overall IEP compliance ratings. No significant differences were found in

student math achievement between the different overall IEP compliance ratings. Generalizability of the results is limited due to the small sample size obtained for this study. Despite its small size, however, the sample did represent larger tendencies as it mirrored statewide trends in school administrative units (SAUs) and geographical distribution SAUs. Implications for policy and practice, both in terms of revisions to current policies as well as supports for special educators, are discussed, particularly in regards to the evident lack of empirical research pertaining to standards-based IEPs and the achievement of students with high incidence disabilities. Given these limited results, and the effects policy decisions pertaining to standards-based IEP mandates have had on the field of special education in Maine, areas of future research are proposed, particularly in regards to study design, instrumentation, and factors affecting the achievement of students with disabilities.

DEDICATION

This dissertation is dedicated to Deborah Yates, Rebecca Cooper, and Penny Perkins; the wise, strong, and resilient women who helped me find my path, and to my daughter, Sophie Yates-Paul, who has plenty of time to find hers.

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LIST OF ACRONYMS

CCSS ..... Common Core State Standards

CCSSO ..... Council of Chief State School Officers

EHA ..... Education for All Handicapped Children Act

FAPE ..... Free Appropriate Public Education

GSS ..... General Supervision System

IDEA ..... Individuals with Disabilities Education Act

IEP ..... Individualized Education Program

LRE ..... Least Restrictive Environment

MAP ..... Measures of Academic Progress

MEPRI ..... Maine Educational Policy Research Institute

MUSER ..... Maine Unified Special Education Regulations

NBPTS ..... National Board for Professional Teaching Standards

NCLB ..... No Child Left Behind Act

NWEA ..... Northwest Evaluation Association

RIT ..... Rasch UnIT

SAU ..... School Administrative Unit

SPDG ..... Special Purpose Development Grant

SPSS ..... Statistical Package for the Social Sciences (IBM)

Chapter One: Introduction

Statement of the Problem

The standards-based Individualized Education Program (IEP) movement, in accordance with certain federal initiatives, such as the 2001 No Child Left Behind Act (NCLB) and the 2004 Reauthorization of the Individuals with Disabilities Education Act (IDEA), was designed to improve students' with disabilities access to the general education curriculum and academic performance (La Salle, Roach, and McGrath, 2013). Indeed, the 2004 Reauthorization of the IDEA reaffirmed one of the Act's foundational concepts in its stipulation that,

> … 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 that 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 is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. (p. 13)

Students with disabilities must, therefore, have access to, and opportunities for involvement in the general education curriculum in order to improve their educational performance (Fisher, Roach, and Frey, 2000). To accomplish this goal, IEP teams must design educational plans that allow students to master rigorous academic knowledge and skills drawn from the regular education curriculum (Hunt, McDonnell, and Crockett, 2012). As such, NCLB and the 2004 Reauthorization of IDEA served, at the very least, to increase the participation of students with disabilities in state accountability measures

as they require that States assess all students' progress towards mastery of increasingly rigorous state standards in math and English language arts.

Concurrently, as part of the national effort to ensure all students graduate from high school with the skills necessary to reach their post-secondary educational and career goals, the Common Core State Standards (CCSS) were finalized in 2010 and subsequently voluntarily adopted by forty-two states (Council of Chief State School Officers and National Governors Association Center for Best Practices, 2017). While state adoption of the CCSS was voluntary, the Every Student Succeeds Act (ESSA) of 2015 went further. ESSA (2015), the reauthorization of the Elementary and Secondary Education Act of 1965 and replacement of NCLB (2001), mandates that every state provide the federal government with the assurance they have "adopted challenging State academic standards" for math, reading or language arts, science, and other subjects that aligned with entrance requirements for higher educational institutions" (p. 18). In order to foster students with disabilities' attainment of these same standards, therefore, special education practices shifted from efforts to ensure basic access to educational opportunities towards enhancing specially designed instructional alignment with the general education curriculum and fostering student mastery of both content and skill standards.

Special educators' response to ESSA's requirements shifted their focus from ensuring students with disabilities could simply access the general education curriculum to ensuring that students with disabilities could master general education content and skills. One the primary means by which they facilitated this shift was through the use of the standards-based IEP. The standards-based IEP is a document, framed by the state's

general curriculum standards, that contains individualized annual goals aligned with, and chosen to facilitate a student's achievement of, grade level academic standards, wherever appropriate (Maine Department of Education, 2015; Caruana, 2015; Cortiella, 2008). Further, it is a means by which educators can (a) improve the rigor of instruction, (b) ensure student access to the general education curriculum, (c) foster increased inclusion and enhance the ease of such inclusion, and (d) enhance student achievement and student progress towards grade level academic standards (Roach and Elliot, 2006). As Caruana (2015) noted, many policy makers and educators believe standards-based IEPs, and the progress they support, foster student access to the specially designed instruction and curricular content necessary for them to achieve at grade level. In accordance with this understanding, states began to adopt standards-based IEP policies that mandated their usage. Nine states adopted standards-based IEPs between 2000 and 2005, sixteen more adopted standards-based IEPs between 2006 and 2010, and many other states concurrently chose to at least partially implement standards-based IEP practices such that, by 2010, 33 states had joined the movement (Ahearn, 2010).

Maine was no exception. The state's initial efforts associated with this movement focused on providing professional development associated with standards-based IEPs through Goal 3 of the State's five-year Special Purpose Development Grant (SPDG). As it worked to informally provide its special educators with guidance and training in this area, the State officially mandated the use of standards-based IEPs in its 2014 "Policy on Standards-Based IEP Goals." This Policy was a key state reform designed to further the cause of equitable educational opportunities for students with disabilities. In its articulation of the necessary components of standards-based IEPs, Maine's Policy made

clear that the state's mandate for "all students, all standards" was extended to students with disabilities for the purpose of preparing them for post-secondary goal attainment upon their completion of high school. Inherent in this Policy is the recognition, as clarified by McDonnell, McLaughlin, and Morison (1997), that students with disabilities should have access to the same relevant knowledge, content, and skill instruction as their regular education peers.

In both the regular and special education settings, exposure to a comprehensive curriculum and its associated rigorous instruction yields increased levels of student mastery. Studies conducted by Riordan and Noyce (2001) in Massachusetts, for example, found standards-based mathematics programs have an impact on student achievement regardless of gender, race, and economic status. Their quasi-experimental study used matched comparison groups of Massachusetts students to investigate the impact of one standards-based elementary and one standards-based middle school math program on student achievement. Results indicated that, while these studies focused primarily on schools with advantaged student populations and did not focus on the quality of instruction provided in either setting, students in schools using either one of these standards-based programs performed better in certain outcome areas on the 1999 state math assessment as compared to students in matched schools using a traditional program (Riordan and Noyce, 2001). In order to ensure these approaches also improve the educational performance of students with disabilities, these students should be exposed to a standards-based curriculum by both including them in regular educational settings and incorporating these self-same standards into their IEPs. Fisher and Frey (2011) noted that, if students with disabilities are to participate in standards-based reforms, access to

the core curriculum is increasingly essential and is more easily facilitated when these students' IEPs are based on the same standards as those for which regular education students are held accountable. As affirmed by Browder, Spooner, Wakeman, Trelar, and Baker (2006), when special educators link specially designed instruction and IEP goals to state standards, students are more likely to be provided with authentic instruction in a sequential and appropriately challenging curriculum.

A linkage between standards-based instruction and improved post-secondary student outcomes further justifies the provision of instruction based on rigorous standards in both the regular and special education settings. Research conducted by Hunt, McDonnell, and Crockett (2012) shows that, when provided with systematic, standards-based instruction, students with severe disabilities can learn complex academic knowledge and skills aligned with standards, which subsequently increases their quality of life after high school. Despite such connections between general education instruction and outcomes, special educators have historically demonstrated a reluctance to link specially designed instruction to general education expectations and standards. In the case of children with severe disabilities, for example, researchers such as Ayres, Lowrey, Douglas, and Sievers (2011) highlighted their opposition to such efforts when they voiced their hope that the instructional focus on "fragmented, watered down academic standards [would soon become] less important than working toward meaningful individualized curricula" (p. 12). They, like many other special educators, claimed standards-based IEPs were not able to be appropriately individualized.

Surveys of special education teachers conducted by Sands, Adams, and Stout in 1995, well before the occurrence of the IDEA mandates and shifts towards standards-

based IEP policies, provide possible explanation for this, as they revealed that special educators' "instructional decision making and practices [were] often haphazard and widely divergent" from the general education curriculum (p. 69). These perspectives and practices subsequently sustained an unwillingness among special educators, in Maine and elsewhere, to make explicit linkages between student IEPs and general education expectations. As a result, while research connecting this reality to poor levels of achievement of students with disabilities was absent, stakeholders moved to solve the problem. Maine's "Policy on Standards Based IEP Goals" was designed, therefore, not only to ensure equity in access to educational programming for students with disabilities, but also to mandate that special educators make the associated shifts towards standard-based instruction and program design.

Maine's Policy on Standards Based IEP Goals begins with a quote from the United States Department of Education (2005), which emphasized that "being in special education does not mean that a student cannot learn and reach grade-level standards" and that all students should be afforded the opportunities to learn and master general education curricular content (p. 1). Indeed, as stated so clearly by Courtade, Spooner, Browder, and Jimenez (2012), "the opportunity to learn general curriculum content is a right of every child who attends school" and "to deny someone an opportunity that all other members of society are afforded" is at the very least unjust (p. 5). Standards-based IEPs are now recognized as the means by which educators can shift from low expectations to high expectations and afford students with disabilities an equality of opportunity on par with their non-disabled peers. To this end, the most recent iteration of Maine's "Policy on Standards-Based IEP Goals" set forth the expectation that, beginning

in the 2016-2017 school year, IEPs contain standards-based IEP goals and that districts would be reviewed for compliance in this area as part of the state's general supervision system (Maine Department of Education, 2015).

The strength and continuance of these federal and state policies remains undeterred. However, Heward (2003) noted education has a "long history of adopting new curricula and teaching methods with little or no empirical evidence of effectiveness" (p. 200), and Odom, Brantlinger, Gersten, Horner, Thompson, and Harris (2005) further recognized the "long-standing discussion [specifically] in the field of special education regarding the distance between research and practice" (p. 142). At the current juncture, available empirical research has primarily focused on investigating how standards-based special education programming affects the functionality of students with significant cognitive disabilities, as well as on measuring the quality of the IEP document itself. Few studies evaluating the impact of the implementation of standards-based IEP programming on the achievement of children with high incidence disabilities exist.

Despite a pervasive lack of conclusive evidence verifying the efficacy of standards-based IEPs on the achievement of students with high incidence disabilities, Maine and other states continue to mandate the use of standards-based IEPs. Research is needed to generate a body of evidence that may enable educators to formulate solid conclusions regarding the efficacy of standards-based IEPs such that they can suggest revisions to standards-based IEP practices and policies, and associated accountability measures, to ensure they reflect the implementation of best practices. Conclusions from said research may also inform suggestions for future areas of research pertaining to the achievement of students with disabilities, efficacy measures of special education,

methods to ensure student access to and progress in the general education curriculum, and standards-based IEP creation and implementation. Results of this research will further enable policy makers and educators alike to create and implement more effective policies designed to improve the achievement of students with disabilities.

Purpose of the Study

Despite the prevalence of standards-based IEP mandates in Maine and numerous other states, and their high degree of impact on practice and policy in special education, relatively few studies have been conducted to investigate the effects of standards-based IEPs on student achievement. Therefore, the purpose of this quantitative study was to, through an analysis of covariance, measure the significance of the impact of Maine state compliant standards-based IEPs on the achievement of students with high incidence disabilities in math and reading, Specifically, the study used validated and reliable measures to compare the average amount of variation between the means, and examine whether or not there was a significant difference between Maine state compliant standards-based IEP ratings and percentage of student growth target attainment in math and reading on the Northwest Evaluation Association Measures of Academic Progress (NWEA MAP) assessment. Study results were subsequently examined through a public policy lens in order to propose how outcomes, and future associated research, might inform policy decisions pertaining to standards-based IEP mandates in Maine and elsewhere.

Research Questions

The overarching question guiding this study is: Do state compliant standards-

based IEPs impact the academic achievement of students with high incidence disabilities? Specific questions include:

1) Are there evident patterns in compliance of subcomponents of standards-based IEPs as measured by Maine's General Supervision System Monitoring Tool?
2) Is there a statistically significant difference between the math achievement of third grade students with high incidence disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?
3) Is there a statistically significant difference between the reading achievement of third grade students with high incidence disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

Significance of the Study

The standards-based IEP movement arose as a direct result of the evolution of the understanding of special education as the means by which students with disabilities must be afforded equality of access to the general education environment to the means by which students with disabilities must be afforded equality of opportunity within the general education environment. Caruana (2015) observed "setting high standards for students with disabilities reflects a shift from deficit to asset thinking in the planning of instruction and assessment. Standards-based IEP goals and objectives establish this asset model" (p. 238). Courtade et al. (2012) further articulated this concept in their recognition that what educators know about the potentials of students with disabilities to

learn academic content has been significantly restricted by their preconceived notions and historical practices.

The premise of the standards-based IEP movement, therefore, lies in the idea that setting high academic standards for all students, expecting teachers to teach, and students to achieve mastery of those standards, will serve as a lever to improve overall educational quality (McDonnell, McLaughlin, and Morison, 1997). Given these realities, standards-based IEPs embody the initiative designed to address the moral issue of equality of opportunity for all students, improve outcomes for students with disabilities, and, as a result, increase the societal return on investment in special education.

Prior to the requirements associated with the implementation of standards-based IEP practices, the field of special education was burdened by detailed compliance procedures, and their associated paperwork. As noted by Brunsting, Sreckovic, and Lane (2014) in their research synthesis of factors contributing to special education teacher burnout, special education teachers are overburdened with responsibilities and must use significant amounts of their time performing non-instructional tasks. In Maine, these factors have caused the Maine Department of Education (2016) to designate Special Education (including teachers and speech-hearing clinicians) as a shortage area since the 1990s, up to and including the 2017-2018 school year. This circumstance is perpetuated by the fact that special education teachers are responsible for evaluating each student, writing up an individualized education program, teaching the students, overseeing ed techs or less than fully certified colleagues, filling out state and federal paperwork, and meeting regularly with students and parents (Gallagher, 2016). According to Jill Adams, the executive director for Maine Administrators of Services with Children with

Disabilities, as cited by (Gallagher, 2016), "it's a very tough job." Due to the increasing levels of student need, however, as noted by Fore, Martin, and Bender (2002) "the retention of special education teachers… is a critical concern in many schools across the nation" (p. 36).

The professional development, time, and learning that accompany the use of standards-based IEPs present a significant challenge to the field. Special educators must work continuously to balance the need to design programs that ensure student access to, and progress in, the general education curriculum, while at the same time providing instruction and supports based on students' unique needs (Lynch and Adams, 2008). To accomplish these mandates through a standards-based IEP, special educators require what Ahearn (2006) refers to as "detailed groundwork in the state standards and then targeted professional development on applying standards to the IEP process" in order to prevent them from just re-wording standards into goals (p. 9). Unfortunately, special educators often do not have access to training opportunities despite the fact that consistent, high quality professional development is directly related to teacher retention. Gersten, Keating, Yovanoff, and Harniss (2001), in their study of factors leading to special education teacher attrition and retention in three large urban school districts, revealed that appropriate professional development opportunities for special educators play a critical role in explaining individuals' commitment to remain in special education teaching. While the impact of standards-based IEPs on the roles and responsibilities of special educators is beyond the scope of this study, the fact that the development of skills necessary to create and implement standards-based IEPs represent a considerable investment of resources has important policy implications.

Given the moral imperative to ensure equality of opportunities, the continued era of school-based accountability and less than desirable outcomes for students with disabilities, and the larger context of the impact of special education compliance procedures on the retention of special education teachers, this study will contribute to a better understanding of the existence, and significance, of the impact of standards-based IEPs on the achievement of students with high incidence disabilities. This, in turn, will inform both future policies and revisions to current policies dedicated to ensuring students with disabilities can access, and make progress in the general education curriculum.

Definitions of Key Terms

General Education Curriculum: The same curriculum as that for nondisabled children that includes, as determined by Sands, Kozleski, and French and cited in Wehmeyer (2002), a plan for classes offered by a school, materials used to present information to students, the subject matter taught to the students, the courses offered in a school, and the planned experiences of the learners under the guidance of the school.

High Incidence Disabilities: Disabilities that are the most common among children with disabilities in U. S. schools, and that typically include students eligible for services under the categories of Other Health Impairment, and Specific Learning Disability, as determined by meta-analyses comparing patterns of IQ, academic achievement, and behavioral characteristics (Trainor, Morningstar, and Murray, 2016)

Individual Education Program: A statement of the special education and related services and supplementary aids and services, based on peer-reviewed research to the extent practicable, to be provided to the child based on his or her unique needs (IDEA, 2004).

Significant Cognitive Disabilities: Students with moderate/severe intellectual disabilities who may also have physical disabilities, sensory disabilities, or autism; also often referred to as severe disabilities (Courtade, Spooner, Browder, and Jimenez, 2012).

Specially Designed Instruction: Instruction that is provided under the auspices of an eligible child's Individualized Education Program and that adapts, as appropriate, to the child's needs, the content, methodology, and/or delivery of instruction to address the unique needs of the child that result from the child's disability (Cortiella, 2008; IDEA 2004).

Standards-Based Individualized Education Program (IEP): a process and document that is framed by the state's general curricular standards and that contains annual goals aligned with, and chosen to the facilitate the student's achievement of grade level academic standards, wherever appropriate (Maine Department of Education, 2015; Cortiella, 2008).

Chapter Two: Review of the Literature

Introduction

The following literature review examines the background of standards-based IEP practices at both the national and state levels in an effort to identify a gap in empirical research connecting standards-based IEPs to the achievement of students with disabilities. First, the concept of the efficacy of special education is explored through the lens of the larger concept of student achievement, as well as the concerns related to the efficacy of special education when viewed through a lens focused on traditional measures of achievement such as the Northwest Evaluation Association Measures of Student Progress assessment. Second, the policy framework for the standards-based IEP movement, at both the federal and Maine state levels, is reviewed. Third, the concept of student inclusion in the least restrictive environment is explored as a significant contributor to the impetus for the evolution of standards-based IEP movement. Lastly, specific standards-based IEP practices are detailed, as is existent research connecting standards-based IEP practices to student outcomes. Of note is the general dearth of research in this latter area, as well as the disproportionate focus of available research on the impact of standards-based IEPs on students with significant cognitive, low incidence disabilities.

Efficacy of Special Education

Student educational achievement definitions and measures. Student achievement, which Merriam Webster's dictionary defines as a result gained by effort, is arguably a key focus of public education, as it is inextricably linked to the established concept of a good and worthwhile life. Hattie and Anderman (2013) note specifically

that "for as long as schools have existed, enhanced student achievement has been the most important outcome of schooling at any level" (p. xix). Unfortunately, most stakeholders in public education do not possess a common, comprehensive understanding of student achievement. In a 2011 white paper, for example, the National Board for Professional Teaching Standards (NBPTS) found that "precise definitions of [student achievement and student learning] have proven elusive, as each of these concepts has several layers of meaning and nuance" (p. 27).

Although efforts to define this concept continue in the realm of education, the connection between achievement and student attainment of specific learning goals is relatively common (Guskey, 2013). The nature of these learning goals is somewhat murkier because education is provided to meet students' academic, functional, and developmental needs. According to Guskey (2007), student achievement is a multi-faceted concept that addresses different types of learning, should be measured in multiple ways, and should be interpreted differently according to the purpose of measurement. The continued discrepancies in various stakeholders' definitions of student achievement, and its multifaceted nature, have led to national efforts to better define this concept. For example, the NBPTS 2011 Student Learning, Student Achievement Task Force was designed, at least in part, to investigate the key difference between student learning and student achievement. The Task Force specified that "*student achievement* is the status of subject-matter knowledge, understanding, and skills at one point in time, while *student learning* is the growth in subject-matter knowledge, understanding, and skills over time" (p. 9). While more extensive discussions of the nuanced differences between student learning and student achievement are outside the purview of this research, it is important

to recognize the NBPTS definition addresses both the fixed nature of student achievement, and its connection to content and skills related to subject matter. It follows that, in the current context of public education in Maine, the concept of student achievement is commonly equated with academic performance.

When equated with academic performance, student achievement should be measured differently across the various domains of learning; i.e. achievement in literacy should not be measured in the same way as achievement in physical education (Hattie and Anderman, 2013). As a result, various indicators used to measure student achievement have been comprised of attendance records, credits earned, performance/competency tests, and teacher made tests. However, according to Newman (1992), these indicators are faulty for reasons, which include, but are not limited to:

* Failure to indicate what the student actually knows or can do,
* Neglect of important educational goals such as creativity, interpersonal sensitivity, psychological development, civic responsibility, or critical thinking,
* Perpetuation of cultural biases that unfairly restrict educational opportunity,
* Providing information that has little relationship to success beyond high school. (p. 5)

As evidenced by this list of concerns, Guskey (2007) notes the available tools used to measure student achievement, particularly standardized assessments, have significant limitations. As the NBPTS Task Force aptly clarified in their 2011 report "what is tested does count, but much of what counts cannot be tested. Achievement will always be larger than a single test and is not specific to any particular assessment" (p. 29). Controversy continues to exist at the federal, state, and local levels regarding the

appropriate definition of student achievement and the ways said achievement should be measured.

However, as a result of the lack of consensus regarding the complexity of student achievement, the tendency on the policy level has been to default to traditional definitions and measures of student achievement - standardized assessments focused on math and English/language arts. On the federal level, the most broadly used assessment, the National Assessment of Educational Progress (NAEP), has been used in public and non-public schools since 1969 to assess students in core content areas and to subsequently document trends in performance according to location and subgroup (Campbell, Voelkl, and Donahue, 1997). On the state level, since 2001, NCLB required standardized testing of every student in mathematics and reading every year in grades 3 through 8, and grade 11 for accountability purposes. Stiggins (2002) noted, as a result of this policy mandate, states consistently have used high stakes assessments to tell them how much students have learned and whether standards are being met. Indeed, according to Barton (1999), Americans "want numbers when they look at students, schools, [and] state education systems" (p. 4) and they depend on standardized tests to give them those numbers.

Similar dependencies pervade the educational research field. Despite indicators that the concept of student achievement is associated with far more than a single instructional realm, countless studies incorporate the assumptions that student achievement consists of only academic content and skill acquisition, and that such achievement is best measured by standardized tests. In their study of how school leadership affects student achievement, for example, Louis, Dretzke, and Wahlstrom (2010) specifically noted the measures of student achievement they used "were derived

from school-level scores on the states' tests used for measuring adequate yearly progress (AYP) in response to No Child Left Behind" (p. 322). Isernhagen and Bulkin (2011) made conclusions about the effects of mobility on student achievement based on their performance on criterion referenced assessments in reading, writing, math, and science. Han, Capraro, and Capraro (2014) used Texas high school students' mathematics scores on the state assessment to measure student achievement in their study about the student factors that impacted STEM achievement and Clark, Gleason, Tuttle, and Silverberg (2015) noted, to "measure the effects of charter schools on student achievement, [they] relied on test score data from state assessments" (p. 426).

Educational researchers, it seems, equate student achievement with student performance on standardized assessments. McLaughlin and Thurlow (2003) note that educational accountability relies on assessments and contributes to the prevailing logic that unless student knowledge is tested, educators won't know whether students have met necessary content standards. Due to the prevalent use of test scores as prime indicators of student achievement, and the subsequent use of this measure to evaluate the effectiveness of teachers, schools, curricula, and educational best practices, it is a safe assumption that stakeholders equate achievement to student performance on traditional, standardized measures of academic success.

In the context of the national connection between the concept of student achievement and academic performance, and the subsequent reliance on standardized test scores to measure such achievement, there is increased need to define and measure other essential components of the American public education system. Given the fact that, in 2013-2014 the number of children ages 3-21 who received special education services was

6.5 million, or about 13 %, of all public school children, special education is one of those key components (National Center for Education Statistics, 2016). With few exceptions, the achievement gap between students with and without disabilities persists, and most report that "it is large" (Gilmour, Fuchs, and Wehby, 2018). This reality, when associated with increasing student numbers and expenditures, has thrust special education into the political spotlight, as stakeholders seek to further develop their understanding of special education, obtain evidence of its effectiveness, and identify ways to improve its efficacy.

Northwest Evaluation Association measures of student progress assessment. The Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) Growth interim assessments are computer adaptive assessments that measure student academic performance, regardless of whether they are below, on, or above grade level (NWEA, 2017). These assessments in math, reading, language usage, and science, which have been developed for students in grades K-11, can be administered in the Fall, Winter, and Spring of a school year and are aligned with state standards, the Common Core State Standards, and the Next Generation Science Standards, as appropriate. NWEA MAP assessments are untimed and include integrated accessibility tools. Wang, McCall, Jiao, and Harris (2013) determined the NWEA MAP assessment can be interpreted with validity across grades for different academic terms in different states. Because "validity is one of the most important considerations when evaluating a test," the finding that the constructs of the MAP tests are well defined, equivalent across grades, and have the same patterns across academic years confirms its value as a student achievement measure " (p. 98).

As a result of these features, Maine school districts laud the use of this assessment as an effective means to identify individual student needs, often crediting the tool with the ability to make improvements in student performance over the course of the year (McMillian, 2011). In the fall of 2017, for example, the Curriculum Coordinator in Ellsworth, Maine confirmed the district used student performance on the NWEA test to help educators focus instruction on the areas in which the student needed to practice (Osborn, 2017). As detailed by Picus, Odden, Goetz, Aportela and Griffith (2013) in an independent review of Maine's Essential Programs and Services Funding Model, Maine schools "use a combination of student assessments to provide the data they need to improve instruction, identify students struggling to learn, plan interventions for these students, and to monitor student progress" (p. 66). Most of the schools in their study used some version of the NWEA MAP assessments for benchmarks tests in September, January, and May of the school year.

Beyond its use as a progress monitoring tool, the NWEA is also recognized as a valid indicator of student performance on other assessments. In March 2010, later revised in January 2016, NWEA conducted a study of the alignment of the NWEA with the New England Common Assessment Program in order to help schools in Maine, New Hampshire, Rhode Island, and Vermont better predict student performance on that state assessment using NWEA scores. Andren (2010), in a quantitative doctoral study, confirmed that the reading NWEA MAP assessment was the best predictor of performance for a Maine student's state assessment (NECAP) scores, and, in fact, had "more predictive power for students who are at risk for reading problems than for the general student population" (p. 19). Although the NECAP assessment is no longer used,

as it was replaced by the Smarter Balanced Assessment, which was then replaced by the eMPowerME Mathematics and ELA/Literacy assessments, the NWEA is accepted as predictive of student performance on 'high stakes' achievement measures. The NWEA is widely accepted in Maine as a valid and reliable measure of student progress, and achievement.

Achievement of students with disabilities. Special education was created by the Education for All Handicapped Children Act (1975) to protect the rights of, meet the individual needs of, and improve results for students with disabilities in the public education environment. The Individuals with Disabilities Education Improvement Act (2004), the most recent iteration of the federal government's landmark legislation guaranteeing free appropriate public educational programs to children with disabilities, defined special education as:

> Specially designed instruction, at no cost to the parents, to meet the unique needs of a child with a disability, including— (i) Instruction conducted in the classroom, in the home, in hospitals and institutions, and in other settings; and (ii) instruction in physical education [and] includes (i) Speech-language pathology services, or any other related service, if the service is considered special education rather than a related service under State standards; (ii) travel training, and (iii) vocational education. (Section 300.39)

This definition left little question in regards to the meaning of special education can be briefly summarized as individualized instructional services designed to meet a child's disability related needs and provided at no cost to parents. The methods of how to measure the effectiveness of special education, however, are not consistently

operationalized across the individual, district, state, or federal realms. Goals that have consistently eluded policy makers, educators, and other stakeholders include defining student achievement, clarifying desired outcomes, and determining specifically how to measure success for students with disabilities. However, the Council of Chief State School Officers, as cited by Dickens and Shamberger (2017), recognize continued concerns pertaining to the lasting achievement gap between students with disabilities and their peers of comparable ages.

Despite these concerns, no one, it seems, agrees on how to determine if special education is actually working, and what outcomes are expected. This is due, at least in part, to the very individualized needs of each student resulting from his or her disability. Zigmond (2003) emphasized the effectiveness of special education programming depends not only on the characteristics and needs of an individual student, but also on the quality of a particular program implementation. There is also a greater recognition that special education is challenging because it is hard to do well, it is expensive, its results haven't been very satisfactory, and the numbers of students it serves have grown quickly over time (Levenson, 2012). Furthermore, policy makers' traditional focus on educational access and logistics, as opposed to educational opportunities and quality, for children with disabilities resulted in the low-level focus on accountability prior to the passage of NCLB in 2001. NCLB increased attention on student outcomes as it mandated the inclusion of students with disabilities in state assessment data and linked their performance to accountability measures. As noted by Thurlow (2000), public reporting of standardized test scores prompts programmatic improvements. However, academic performance was not the focus of legal or political measures in the field of special

education prior to 2001 and those "prompts" for instructional improvements were non-existent.

Beyond the conclusions drawn from readily available data associated with standardized assessment measures, general research and methodology associated with efforts to determine the effectiveness of special education have been problematic and fraught with errors in variable definitions and inappropriate comparisons (Stein, Leinhardt, and Bickel, 1989). Effectiveness research is singularly lacking. Measuring the achievement of students with disabilities using state assessments is problematic particularly due to the use of accommodations that are specified on student IEPs. McLaughlin and Thurlow (2003) recognized "the extreme variation that exists in state accommodation policies for students with disabilities reflects the fact that there exists little consensus as to which specific accommodations are threats to validity" (p. 442). Zigmond (2003) noted there is no compelling research relating special education setting to student progress on achievement measures primarily because "studies worthy of consideration in a meta-analysis or narrative literature review, with appropriate controls and appropriate dependent measures, are few and far between" (p. 196). However, in view of the increased level of attention to student outcomes, and the fact that traditional measurements of these outcomes reveal a concerning picture of the performance of students with disabilities, stakeholders have, regardless of the lack of research to support them, initiated and refined efforts focused on improving the achievement of students with disabilities.

Policy Framework for the Standards-Based IEP Movement

Equality of access. Political advocacy for equality of programming, and equality of outcomes, for children with disabilities such as that exemplified by Maine's Policy on Standards-Based IEP Goals is still relatively new in the United States. Prior to the Education for All Handicapped Children Act of 1975, children with disabilities were, for the most part, isolated and forgotten by general society. Americans, due to misperceptions, prejudices, and fears, did not consider these individuals as requiring, or deserving, the rights to public education. Children with disabilities remained generally excluded from public schools, or were, at best, offered inadequate programs (Neuhaus and Smith, 2014). While a lack of sufficient social and political representation contributed somewhat to these exclusions, they also resulted from a lack of understanding of the nature of various disabilities, and from the common social misperception that disabled individuals were somehow less intelligent, or inferior, to others. In the 1893 case *Watson v. City of Cambridge,* for example, the Massachusetts Supreme Judicial Court determined a child who was "weak in mind" and could not care for himself could be expelled from public school because he could not benefit from instruction (Yell, Rogers, and Rogers, 1998).

It was not until the Supreme Court addressed the constitutionality of educational inequalities that efforts to provide access to public education for children with disabilities gained traction. The *Brown v. Board of Education of Topeka* (1954) decision opened the door to the expansion of programs for underrepresented populations when it affirmed education was a right which must be made equally available to all people terms.

Advocates for children with disabilities now had a legal context from which they could argue for fulfillment of the right to an education.

Coupled with this judicial verification of the equal protection clause, however, was a painstakingly slow development of the larger awareness that children with disabilities deserved equal access to education. Even as late as 1970, as reported by the U.S. Department of Education (2010), U.S. schools educated only 1 in 5 children with disabilities, and many states had laws that excluded children from school, particularly those who were deaf, blind, emotionally disturbed, or intellectually disabled. This segregation related not only to the entrenched sense of fear and lack of acceptance of children with disabilities, but also to the states' lack of financial resources to create and implement special education programs (Coates, 1985).

Still, after the *Brown* (1954) decision, citizens, and courts, recognized that children with disabilities should be afforded the same educational opportunities as their non-disabled peers. Advocacy groups formed by parents, educators, and other providers, such as the National Association for Retarded Citizens, the Council for Exceptional Children, and the Association for Persons with Severe Handicaps, reached the national stage in the 1950s and began decades long efforts to enhance the political clout of students with disabilities (Yell, Rogers, and Rogers, 1998). In the courts, the case of *PARC v. Commonwealth of Pennsylvania* (1972) signified a major shift in favor of access, when the Court decided children with disabilities could not be "excluded from a public program of education and training" (p. 1) and in so deciding gave this group of citizens "new hope in their quest for a life of dignity and self-sufficiency" (p. 21).

The U.S. District Court went further in *Mills v. Board of Education, District of Columbia* (1972) when it decreed the District of Columbia must provide to each child of school age "a free and suitable publicly-supported education regardless of the degree of the child's mental, physical, or emotional disability impairment" (Judgement, para. 4). While the court system did not, at this time, take on the issue of opportunity for equitable educational outcomes, the standard was set; children with disabilities had equal rights to a public education.

Familial and social advocates, armed with legal affirmations from the courts, subsequently contributed to the successful passage of federal legislation designed to guarantee children with disabilities access to public education. The Education of the Handicapped Act of 1970 authorized distribution of grants to states to help them design, implement, and improve programs for children with disabilities (Coates, 1985). However, it was the passage of the EHA (1975), designed to address the needs of children who had been completely denied or provided with only limited access to public education, that truly ushered in a new era (U.S. Department of Education, 2010). *PARC v. Commonwealth of Pennsylvania* (1972) had established the right of children with disabilities to public education; the EHA (1975) gave states a way to pay for it. This landmark legislation established key components of programming for children with disabilities; components that would eventually form the foundation of the standards-based IEP movement.

While the EHA (1975) mandated procedural due process, nondiscriminatory assessment, and parental participation, it also included provisions for a free appropriate public education (FAPE), least restrictive environment (LRE), and individualized

educational programs. The concept of FAPE meant every child with a disability must be provided with an educational program consisting of special education and related services designed to meet his or her unique needs, at no cost to the parent. The EHA carefully balanced this concept with its LRE requirement, which stipulated children with disabilities must be educated to the maximum extent appropriate with their regular education peers. Both concepts were documented in the child's IEP, which had to include individualized goals and services to be provided by the school.

These mandates were supported by the EHA's provision of financial assistance to the states to fulfill their responsibilities under the law (Coates, 1985). The EHA, while not technically binding, achieved close to complete implementation in the states due to its association with federal funding. In addition, this legislation was essential to ensuring children with disabilities had appropriate levels of access to public education and to emphasizing the importance of designing individualized programs that met their unique needs. The EHA did not, however, address the issue of maintaining the instructional rigor necessary to foster equitable outcomes. As a result, individualized programming soon became associated with an intermittent curriculum, a focus on functional skills, and decreased expectations.

In what appears to be a concerted attempt to make up for the injustices perpetrated towards individuals with disabilities throughout United States' history, policy makers continued to support access to educational opportunities for children with disabilities over the course of the next two decades. Due to this inordinate focus on access to education, and a minimal emphasis on the actual quality of this education, special education developed into what Ahearn (2006) described as a "parallel system" in which

students' educational programs were poorly, if at all, coordinated with general education programs (p. 3). Later, in the 1980s, the educational concept of normalization led to an increased focus on preparing students for the "real world," which continued to justify minimal programmatic focus on academics (Ahearn, 2006).

As a result, most of the amendments to the EHA, specifically those made in 1986 and 1990, primarily focused on expanding protections and access to public education programs. Those amendments only peripherally revealed an increased awareness that the equality of educational programs and educational outcomes were as important as ensuring initial access to public education. For example, the 1990 amendments, in which the EHA was renamed the Individuals with Disabilities Education Act (IDEA), essentially served to establish requirements for transition services to support students after their graduation from high school and did little to address the need to foster more rigorous, high quality instruction.

Equality of opportunity. The 1997 amendments to the IDEA were, however, of crucial importance to the purpose of fostering students with disabilities' access to educational opportunities on par with those provided to their regular education peers and the purpose of developing standards-based IEP goal policies. These amendments required IEPs to explicitly link a child's disability and his or her achievement to the general education curriculum. Specifically, the 1997 IDEA amendments mandated that each child's IEP include "a statement of the child's present levels of educational performance, including—(I) how the child's disability affects the child's involvement and progress in the general curriculum" (p. 111). They also required IEP Teams to include in their ranks a regular education teacher for the purpose of providing input

related to regular education curriculum and programming. These specifications revealed an increasing political awareness of the problematic nature of special education programs that provided instruction lacking rigor or connection to the general education curriculum. The 1997 amendments to IDEA left no doubt that policy makers believed the educational experiences of students with disabilities were more effective when their programs were based on high expectations and facilitated access to the general education environment to "the maximum extent possible" (p. 11). The era of a "piecemeal" special education curriculum, created by special educators' attempts to 'pick and choose' appropriate content, was starting to come to an end (Kurth and Mastergeorge, 2010).

As a result of these federal initiatives, the IEP creation process had to consider the linkage of general education content to the individual's post-secondary goals, the age of the student, and the extent to which he or she needed access to functional and/or developmental instruction (McDonnell et al., 1997). Furthermore, the mandated involvement of a regular education teacher in a child's programming enhanced the understanding that students with disabilities should, regardless of their present levels of performance, maintain academic and functional connections to the regular education environment. In the 1997 Amendments to the IDEA, policy makers were explicitly demonstrating their growing belief that raising expectations for children with disabilities was essential to fostering improved outcomes. As quoted by Kochhar-Bryant and Bassett (2002), Secretary of Education Richard Riley commented in his address during the signing of the IDEA 1997 amendments, "There has been literally a sea change in attitude. And at the very core of this sea change is the growing recognition that expectations matter a great deal" (p. 13). Soon, these developments in the realm of special education

were further supported by increasing political emphasis on inclusion and accountability in the larger field of public education.

In 2001, the Elementary and Secondary Education Act (ESEA) of 1994 was reauthorized as NCLB and required states and districts to develop more rigorous academic content standards, aligned assessments, and new curriculum standards (Kochhar-Bryant and Bryant, 2002). The NCLB Act further mandated that children with disabilities should be included in state assessments and associated accountability measures, known as Adequate Yearly Progress (AYP), and that even those children with significant cognitive disabilities should receive academic programming based on alternate achievement standards aligned with the state's content standards (Browder et al., 2006). Schools who failed to meet the AYP standard were subjected to improvement, corrective action, and restructuring measures (U. S. Department of Education, 2002).

Boosting the achievement of students with disabilities by exposing them to the general education curriculum in the least restrictive environment possible became essential to a school's survival. These federal accountability measures contributed mightily to further shifts in special education programming, and the related, inexorable push towards developing standards-based IEPs. A key outcome of this policy related to the associated increased expectations for the programming of students with disabilities (Browder et al., 2006). As a result, out of necessity special educators began to link specially designed instruction at least partially to the general education curriculum, and more generally to reorient the focus of special education programming (Quenemoen, Lehr, Thurlow, and Massanari, 2001).

This movement was hampered by the continued disconnect between the regular education curriculum and special education programs. In a 2004 national survey cited by Cortiella (2008), only seven states required that the IEPs of students with disabilities address state content standards and only 57% of the surveyed teachers said they were "very" familiar with their state's academic standards. The lack of alignment between access and equity had, by this point, reached a concerning level; students with disabilities were being provided instruction that lacked the rigor and high expectations necessary to lead the "life of dignity" referred to thirty years before in the *PARC v. Commonwealth of Pennsylvania* (1972) decision. According to Kochhar-Bryant and Bassett (2002), the structure and design of the standards-based IEP efforts varied across states such that each state "ensured access to the general education curriculum for students with disabilities in a different way," and standards-based IEP goals were by no means universal (p. 11). As a result, promoting students with disabilities' access to, and progress in, the general education curriculum was a prominent agenda item in the next key piece of legislation designed to support special education programs.

The 2004 Individuals with Disabilities Education Act (IDEA) changed the identification of students with learning disabilities, early intervening services, IEP components, teacher qualifications, discipline, and meeting accessibility standards (Council for Exceptional Children, 2016). More relevant to the equitable educational opportunity initiative was the IDEA 2004's specification that each student's IEP must contain academic and functional goals and objectives designed to foster student involvement, and make progress, in the general education curriculum in the regular classroom (Ahearn, 2006). These provisions directly addressed the continued reality that

IEPs were still being designed primarily to address students' functional skill deficits, often incorporated academic content as an afterthought, and were based on programs delivered entirely in the special education setting.

Programmatic challenges associated with minimal standards for students with disabilities were formally addressed in the U. S. Supreme Court's 2017 *Endrew F. v. Douglas County School District RE-1* decision, which attempted to clarify the definition of educational benefit as referenced in IDEA. In *Board of Education v. Rowley* (1982), the Supreme Court determined a child had received a free, appropriate public education if the child's IEP sets out an educational program that is "reasonably calculated to enable the child to receive educational benefits," but the court decision did not establish a standard under which "educational benefits" could be assessed. In its *Endrew F.* decision, as summarized by the U. S. Department of Education (2017), the Supreme Court

> overturned the Tenth Circuit's decision that Endrew, a child with autism, was only entitled to an educational program that was calculated to provide 'merely more than *de minimis'* educational benefit. In rejecting the Tenth Circuit's reasoning, the Supreme Court determined that, '[t]o meet its substantive obligation under the IDEA, a school must offer an IEP [individualized education program] that is reasonably calculated to enable a child to make progress appropriate in light of the child's circumstances.' (p. 1)

In so doing, the Supreme Court reaffirmed the social and political emphasis on the equality of opportunity for students with disabilities, and prompted higher standards for student programs in order to ensure they provided students with more than trivial

educational benefit. It further specified that IEPs must be appropriately ambitious and ensure all children have the opportunity to meet challenging objectives (U.S. Department of Education, 2017). This ruling provided further justification for the standards-based IEP initiative, as it served to raise the standards for achievement of students with disabilities and to facilitate their access to the general education curriculum and attainment of challenging objectives.

Inclusion of Students with Disabilities in the Regular Education Setting

The ideologies associated with the standards-based IEP movement sprang from political and social initiatives designed to ensure students with disabilities were both included in the general education setting, and exposed to the general education curriculum, as mandated by the NCLB Act and amendments to the IDEA. Research findings appeared to support these initiatives. Fisher, Roach, and Frey's (2002) review of inclusion literature, they determined that the separation of children with disabilities from the general education setting was actually detrimental to their learning. Browder, Wakeman and Flowers (2006) affirmed the presence of students with disabilities in the general education classroom increases their opportunities for exposure to general curriculum content, and their opportunity to learn the core academic content associated with their grade levels. Tindal (2006), as cited in Karvonen and Huynh (2007), provided further support for this finding in his conclusion that requiring students to perform skills in natural environments, such as a typical classroom, increases the cognitive demands of tasks and promotes deeper learning. As revealed in an investigation of the influences exposure to the general education curriculum had on students with significant cognitive disabilities' performance on Wisconsin's alternate assessment, Roach and Elliot (2006)

determined students who received curriculum and instruction focused on the general curriculum performed better than those who did not. However, they found the time students spent in the general education setting and the percentage of academic-focused goals on a student's IEP were not as strongly related to student performance on the alternate assessment.

The arguments in support of inclusion are ongoing; available research both proves and disproves the importance of setting as it relates to a child's achievement within general education curriculum. Evidence to support the improved learning of students with disabilities placed in inclusive settings abounds in different content areas. In science, for example, as noted by Grover Whitehurst (2004) the Director of the U. S. Department of Education's Institute of Education Sciences, "there is a lot of content…that simply has to be learned through practice and time on task" (as cited in Whitehurst, 2004, p. 23). Mastropieri, Scruggs, Norland, Berkeley, McDuffie, Tornquist, and Connors (2006) similarly asserted that, when special and regular education students in inclusive science classes work with each other, their content area learning improves at a rate greater than that attained through more traditional instruction. They further noted that students with mild disabilities in eighth grade science classes demonstrated achievement benefits of participation in differentiated classroom instruction (Mastropieri et. al., 2006).

Similarly, Rea, McLaughlin, and Walther-Thomas (2002) found students placed in served in inclusive classrooms earned higher grades, achieved higher or comparable on standardized tests, committed no more behavioral infractions, and attended more days of school than students in pull-out programs. While the focus on their work was rather

narrow in that it was conducted in one small, suburban school district, and the sample size of 58 middle school students with learning disabilities was not representative of larger student populations, the discovery that inclusion enhanced student performance was certainly not unique. In their study of a very different student population, Kurth and Mastergeorge (2010) confirmed this finding for students with autism aged 12-16 who received instruction in the content areas of math and literacy. They focused on the impact of age and education setting on student IEP goals and services and found that the placement of students in non-inclusive settings limited student skill development via access to higher order skill instruction.

Alternatively, the argument against inclusion is also supported by research studies. Barriers to its success include lack of peer acceptance, increased student discomfort, parental anxiety, lack of administrative support, and teacher concerns associated with the support, training, and experience necessary to work with children with disabilities (Kavale and Forness, 2000). In their study of 60 general education teachers in grades Kindergarten through Twelve, McIntosh, Vaughn, Schumm, Haager, and Lee (1993) found teacher behaviors and practices did not differ for students with or without disabilities. Similarly, Baker and Zigmond (1995) concluded, in their study of students with learning disabilities who were fully included in general education classrooms from six different schools in five states, that "special education in inclusive programs is, by design, no longer special" and that students demonstrably struggled with the schoolwork they were assigned (p. 245). Inclusive programming, as demonstrated in these studies, does not necessarily meet the standard for effective specially designed instruction.

Actual measures of the academic achievement of students with disabilities who are included in general education classrooms do not clearly support inclusion. To investigate the impacts of inclusion on the academic achievement of students with significant cognitive disabilities, Dessemontet and Bless (2011) conducted a comparative study of 34 students with intellectual disabilities fully included in regular education classrooms, and 34 comparable students with intellectual disabilities in special schools. The results of their two-year study indicated only slightly more progress in the literacy skills of students in inclusive classrooms as compared to their peers in special schools, and no differences in progress in math or adaptive skills between the two groups. Waldron and McLesky (1998) had similar findings in their comparative study of 71 elementary students with learning disabilities who were fully included in regular education classrooms and 73 students with learning disabilities who received pull-out services. Fully included students made greater gains in literacy than their peers who received services in the special education setting, but there was no significant difference in the math achievement of the two groups. Clearly, as Kavale and Forness (2000) observed, "analysis of the evidence also suggests that the effectiveness of practices associated with inclusion are mixed at best" (p. 287).

Despite these inconclusive findings, it is evident that, in many cases, the participation of students with disabilities in the general education curriculum can potentially benefit their learning, as measured by standardized assessments. However, of the 17 states that had policies or position statements on inclusion, only 59% included students with severe disabilities in those policies, and 71% of these states cited the nature

and severity of a student's disability as a reason for the student to be excluded from the general education setting (Ruppar, Allcock and Gonsier-Gerdin, 2017).

However, if students who receive special education services in inclusive settings, such as the middle school students with learning disabilities highlighted in Rea et al.'s 2002 study, can achieve comparable or improved outcomes compared to students who received services in pull out settings, the justification for separate special education settings is clearly not appropriate for many children with disabilities. Furthermore, Fisher and Frey (2001) recognized the

> mere physical placement of students in general education classrooms… does not comprehensively address the needs, supports, and accommodations required by the law" in order for a student to access the general education curriculum; the content, delivery, and standards associated with instruction are equally as important. (p. 148)

In accordance with the increased accountability standards associated with NCLB and with the IDEA mandates to ensure student access to the general education curriculum, policy makers have since championed the adoption of standards-based IEPs. This approach to IEP development and implementation was considered the means by which students with disabilities would be guaranteed the opportunity to access general education classes, and the exposure to the general education curriculum. Both of which are conditions assumed to be a necessary component of improved achievement.

The Standards-Based IEP Movement

National overview. To ensure educators recognized the importance of increasing the academic focus of IEPs and the rigor of specially designed instruction, the NCLB

mandates required that each state include students with disabilities in all regular state and district wide assessments, or in a state's alternate assessment. No longer was it acceptable for students with disabilities to be excluded from national accountability measures, or for their programs to stray too far from the expectations set for regular education students. As noted by Cathcart, Bertando, and DeRuvo (2009), there was "no reason why students with disabilities should not be given the same opportunities to learn- and be supported in learning- the same general education content as their chronological peers" (p. 1). Special educators, as a result, had to start designing individualized education programs that not only addressed children's unique needs, but also fostered their progress towards mastery of general education content.

Despite evidence of improved achievement for students with disabilities who were exposed to core curricular content in the general education setting, the alignment of IEP goals with content standards was not readily embraced by special educators (Rea, McLaughlin, and Walther-Thomas, 2002; Mastropieri and Scruggs, 2006). They often argue that standards-based educational programs are not unique, and therefore, are not properly designed to meet the individualized needs of students with disabilities. While such claims did not completely forestall states' adoption of rigorous academic expectations for students with disabilities, they certainly delayed and fragmented the concept's expansion. According to Kochhar-Bryant and Bassett (2002), the structure and design of these efforts varied across states such that each state "ensured access to the general education curriculum for students with disabilities in a different way," and standards-based IEP goals were by no means universal (p. 11). Well before the implementation of the IDEA mandates and associated shifts towards standards-based IEP

policies, Sands, Adams, and Stout (1995) conducted surveys of special education teachers that revealed their "instructional decision making and practices [were] often haphazard and widely divergent" from the general education curriculum" (p. 69). Consistency in special education programming, and its connection to established accountability standards, had been absent from the field of special education for some time.

Standards-based IEPs include annual goals aligned with general education curriculum standards. These goals are chosen to facilitate student attainment of, general education curriculum standards, were primarily designed to ensure children with disabilities were not excluded from efforts to improve academic performance (Wehmeyer, Field, Doren, and Mason, 2004). Indeed, as Caruana (2015) noted, some educators believed standards-based IEPs were the means by which students could best access specially designed instruction and curricular content in order to achieve at grade level. Despite the absence of research connecting this reality to improved outcomes for students with disabilities, policy-makers concurred. The 1997 amendments to the IDEA represented the first major effort to promote the achievement of children with disabilities through the policy's mandate for high expectations and access to the general education curriculum to the maximum extent possible.

The linkage of this mandate to the development of the standards-based IEP took longer to develop; before 2000, only New Mexico, Rhode Island, and Wyoming had adopted standards-based IEP policies and, as of 2010, 33 states had joined the movement (Ahearn, 2010). The frequency with which states adopted standards-based IEP policies was due in large part to the recognition that special education instructional practices were not facilitating increased levels of student achievement. With these measures and

associated recognitions of their importance, standards-based IEPs, the perceived means by which the academic achievement of students with disabilities could be improved, moved to the forefront special education programming.

Maine overview. In Maine, the movement towards standards-based IEP goals was quite consistent, a fact that can be attributed to both the federal political context and to the state's proficiency-based diploma initiative. The Act to Prepare Maine People for the Future Economy (2011), often referred to as LD 1422, stipulated that, to develop an education system that prepared all children for future success, the State must ensure all students graduate from high school after having demonstrated mastery of the skills required by post-secondary educational and employment organizations. Efforts to implement Maine's proficiency-based diploma law, which included expectations for children with disabilities, were supported by the federal accountability-based components of the NCLB Act (2001), the IDEA (2004), and the Race to the Top Initiative (2009). As such, LD 1422, starting in 2015, mandated that students must demonstrate mastery of certain standards in order to earn a high school diploma; beyond a reaffirmation of their due process rights, it did not, however, specifically address the needs of children with disabilities. Given calls for clarity from the field, LD 1422 was subsequently amended by Committee to extend its timeline, to further specify the requirements associated with a standards-based high school diploma, and to clarify the exception related to children with disabilities who must achieve proficiency as specified by the goals and objectives of his or her IEP (Act to Prepare Maine People for the Future Economy, 2011). It was also later amended by the Maine Senate to include a grants program to facilitate the transition of school units to these new expectations.

In the atmosphere of educator discontent surrounding LD 1422's requirements for proficiency-based diplomas, Maine developed its 2014 "Policy on Standards-Based IEP Goals." to introduce clarity to the initiative focused on ensuring children with disabilities were supported in their mastery of the same standards as required of all students. Special educators had entered into the era of accountability and, in so doing, were publicly taking responsibility for the unique educational programs of children with disabilities (McDonnell et al., 1997). The initial Policy on Standards-Based IEP Goals clearly outlined the expectations to ensure students' IEPs were designed to foster their attainment of grade level standards, but, in so doing, mandated that special educators to consider outcomes for students many thought were not possible. As a result, many of Maine's special educators balked at the "all students, all standards" mandate, and the associated standards-based IEPs. This controversy eventually compelled the Maine Department of Education to revise the Policy to include not only a more lenient timeline for compliance, but also to clarify that not all students' IEPs had to contain IEP goals based on grade level standards (Maine Department of Education, 2015).

The 2015 version of the Policy stipulated the annual IEP goals for students with disabilities must be based on their strengths and needs, as well as a comprehensive Present Level of Performance Statement. The Policy required that each student's Present Level of Performance Statement detail the child's achievement relative to his or her grade level standards, as well as specifically note which standards he or she had actually met. It also clearly defined a standards-based IEP goal as one that is "aligned to State standards and is chosen to facilitate the student's progress toward the achievement of grade-level academic standards, wherever appropriate" (Maine Department of Education, 2015).

Finally, to ensure integrity of the standards' targeted content and skills, the Policy clearly defined the accommodations that IEP Teams may choose to include in the child's annual goals and/or IEP. These accommodations were considered those supports that "change the manner in which instruction and assessment is delivered," but do "not alter the curriculum level expectation being measured or taught" (Maine Department of Education, 2015). There is evidence throughout the revised 2015 Policy that the Department attempted to balance the concept of an appropriate education with the principle that all students must master all standards in order to earn their high school diplomas.

To support the implementation of these concepts, Maine instituted a professional development model federally funded by a five-year State Personnel Development Grant received in September 2011 (Maine Department of Education, 2011). Goal Three of this Grant focused on increasing educators' knowledge and skills of how to use the Common Core State Standards (CCSS) within instruction for children with disabilities. The State designed multiple phases of trainings to create local experts in standards-based instruction and to support standards-based IEP development within Maine's nine Superintendent Regions. These trainings, which were focused on building the capacity of special educators to implement these practices, were provided according to the following schedule: Phase 1 Training: CCSS Aligned IEP Goal Writing (October/November 2013), Phase 2 Training: Standards Aligned Present Levels of Performance (January 2014), Phase 3 Training: Supporting ALL Teachers for ALL Students (October 2014), Phase 4 Training: Standards Aligned IEPs: A Check In (April 2015, October/November 2015, January 2016) (Yates, 2016). Through these efforts, the Maine Department of

Education both promoted the standards-based IEP movement prior to its Policy mandate and subsequently reinforced the state-wide expectation that all students must be held accountable for meeting all standards through the linkage of special and regular education programming.

Further, the implementation of this Policy occurred during a period of unrest in Maine's educational system. Controversies were particularly associated with L.D. 1422's specification that, starting in 2021, students must demonstrate proficiency in all eight content areas of the Maine Learning Results in order to earn a diploma (Miller, 2018). According to a Maine Education Policy Research Institute (MEPRI) study conducted in 2014, Maine school districts "worked diligently to embrace and implement the core elements of L.D. 1422" and could both see "key benefits" and "key challenges" (Silvernail, Stump, McCafferty, and Hawes, 2014, p. 2). Indeed, due to school districts' struggles to reach a level of readiness associated with the implementation of this law, Maine passed L.D. 1627 in 2016 in order to give schools an extra four years to phase in requirements for student proficiency in all eight content areas, and to support local control of these requirements for those districts ready to move faster than the mandated timeline (Maine School Management Association, 2016). The revisions to the initial law were also due in part to educators' long-standing concerns for students with disabilities and other nontraditional learners who would not be able to demonstrate proficiency in all eight content areas necessary to earn a diploma (Stump, Johnson, and Jacobs, 2017). These concerns, coupled with districts' continued struggles with implementation, did not wane. As such, in the summer of 2018, Maine passed a new law, L.D. 1666, that enabled school districts to choose whether to award diplomas based on student proficiency in

designated content areas or to award diplomas based on student completion of courses, traditional grades, and credits (Miller, 2018). The Policy on Standards-Based IEP Goals, however, has not been revised since its re-issuance in 2015 and special educators are currently assessed for compliance with this Policy through components of Maine's General Supervision System Monitoring rotation.

Standards-Based IEP Practices

IEP components. As defined by Holbrook (2007), a standards-based IEP is one in which the IEP team has incorporated content standards into its development, and considers how a particular student is performing in relation to the state's standards for the grade in which the child is enrolled. Indeed, as Caruana (2015) noted, many special educators believe standards-based IEPs are the means by which students can best access the curricular content and special education programming necessary in order for them to achieve at grade level. Fisher and Frey (2001) verified this claim, noting that, in order to access the core curriculum, students with disabilities need IEP goals and objectives that are based on the same expectations and standards as those for students without disabilities. With the construction of these documents and the associated recognition of their importance, therefore, the academic achievement of students with disabilities became the primary programmatic focus for regulators and special educators alike. By mandating the alignment of statements of a child's academic strengths, needs, and present levels and his or her academic IEP goals and objectives with the state's content standards through the standards-based IEP initiative, policy makers enforced the integration of general education content into special education programming.

IEP construction. Individualized Education Programs must, according to the IDEA (2004), contain a number of required components. They include, per statute [34 CFR 300.320(a)]:

> (a) a statement of the child's present levels of academic achievement and functional performance, (b) a statement of measurable annual goals, including academic and functional goals, (c) for children with disabilities who take alternate assessments aligned to alternate achievement standards, a description of benchmarks or short-term objectives, (d) a description of how the child's progress toward meeting the annual goals will be measured and when periodic reports of the progress the child is making toward meeting the annual goals will be provided, (e) a statement of the special education and related services and supplementary aids and services, based on peer-reviewed research to the extent practicable, to be provided to the child or on behalf of the child, (f) A statement of any individual appropriate accommodations that are necessary to measure the academic achievement and functional performance of the child on State and district wide assessments, and (g) if the IEP Team determines that the child must take an alternate assessment instead of a particular regular State or district-wide assessment of student achievement, a statement of why the child cannot participate in the regular assessment and why the particular alternate assessment selected is appropriate for the child. (p. 37)

Standards-based IEPs include specific construction techniques that fall under a subset of these federally mandated components. Standards-based IEPs must, by definition, include annual goals that are aligned with, and chosen to facilitate student

achievement of, grade level general education standards, when appropriate (Maine Department of Education, 2015). However, they must also include present levels of performance statements that compare a student's present level of performance to the standards at his or her grade level, as well as clear strengths and needs statements that support understanding of the student's level of mastery of standards (Caruana, 2015).

To construct standards-based IEP goals, in particular, Cathcart (2009) suggests a procedure that involves the following steps: (1) Use present level of performance, (2) Choose a grade-level standard, (3) Unpack the standard, (4) Analyze the sub-skills, and (5) Develop an IDEA-compliant goal. A key component of this practice includes the process of breaking down standards into sub-skills both for goal development and for analysis to determine which sub-skills will accelerate student progress towards meeting grade level standards (Cathcart, 2009). Given the complexity of this process, Karvonen and Huynh (2007) recognized special educators, most of whom were unfamiliar with the general education curriculum, needed professional development on state content standards, alternate achievement standards, and curriculum design within the academic realm in order to create viable standards-based IEPs.

Assessments of standards-based IEP quality. While standards-based IEP mandates appeared, in theory, to lay the framework for increased quality of programming, and subsequently increased levels of student achievement, the actual practices associated with standards-based IEP development and implementation were, at least initially, quite distanced from this ideal. Fisher and Frey (2001) used a grounded theory qualitative study to research access to the core curriculum for students with disabilities. Their approach allowed them to directly record the experiences of

stakeholders. The three-year study focused on three students selected from a teacher-nominated pool of 182 students with significant cognitive disabilities who accessed instruction in the general education setting. Sources of data for this study included classroom observations and interviews with teachers, parents, and peers, which were analyzed for common themes. Fisher and Frey (2001) identified these themes as individualized, content-specific accommodations and modifications, collaboration among the teaching team, involving peers, and a disconnect between the IEP process and classroom implementation of curriculum and instruction. While the researchers made a number of findings, essential to an examination of the standards-based IEP movement is the fact that students' IEP goals and objectives "were not based on the same content or performance standards for the other students in the class" (p. 155), thus restricting the students with disabilities' access to the core curriculum. They further noted that student IEPs were static documents that remained the same over the course of the three-year study. Generalizations of this study's findings to a broader population must be made with caution, however, due to the limited sample size, the fact that all students attended schools with established, successful inclusive practices, and the integrated assumption that students' educational needs were being met. Fisher and Frey's (2001) identification of a significant disconnect between students' IEPs and classroom curriculum and instruction emphasized a parallel disconnect between the standards-based IEP ideologies and actual engagement in the practice.

Given the context of the relatively slow implementation of standards-based IEPs throughout the states, Thompson, Thurlow, Quenemoen, Esler, and Whetstone (2001) studied Individualized Education Program (IEP) forms from 41 states to determine the

extent to which they included documentation of standards and assessments. These researchers sought answers to the following questions "(1) Are standards specifically addressed on the IEP form? and (2) Does the IEP form address access to the general education curriculum within documentation requirements for 'present levels of educational performance' and 'goals and objectives?" (p. 6). They found only five of the 41 states' IEP forms addressed state standards and made explanatory conclusions based on these findings. This situation revealed in this study was later remediated through the provision of state policies mandating the use of standards-based IEPs, but there are few recent studies related to the prevalence of the inclusion of standards on students' IEPs.

Professional development. Accomplishing large-scale change in the realm of educational opportunities and outcomes for students with disabilities requires enhanced levels of guidance for educators to help counteract the entrenched focus on meeting students' functional needs. Kurth and Mastergeorge (2010) found in their study of 15 Northern California students with autism that students' IEPs contained only a small percentage of academic goals – 11.1% of all goals for students included in the general education setting and 8.3% of goals for students who were not included in the general education setting. They found some of these same goals were not aligned with the state standards, and that students' IEP teams consistently demonstrated decreasing expectations of the students' ability to participate and make progress in the general education curriculum over time (Kurth and Mastergeorge, 2010).

While this study focused on a small population of individuals, there is evidence special educators throughout the nation minimized their instructional focus on academics for students they felt needed most to learn the skills of daily living, either out of an

inability or unwillingness to institute new practices (Browder et al., 2006). In their qualitative study of special educators' perceptions of the Common Core State Standards (CCSS), Nadelson et al. (2014) found that the link between hours of professional development in the CCSS and knowledge and perceptions of the CCSS suggest that efforts to provide professional development in this area would improve both the knowledge base and attitudes of educators. Professional development pertaining to standard content and associated special educational instruction practices, it seems, is an important component of efforts to ensure standards-based IEPs are properly created and implemented.

Pretti-Frontczak and Bricker (2000) also identified a gap between the methods, and actual practices, of writing IEP goals. They designed their study to determine if specific professional development in writing IEP goals and objectives would improve their quality and, as a result, enhance student achievement. Quality dimensions investigated in this study included IEP goal functionality, generalizability, instructional content (as they related to general education standards), measurability, and hierarchical relationships. Their comparison of the IEP goals prior to and subsequent to the provided professional development revealed a statistically significant difference between pre-training and post-training IEP goal quality. The research showed high quality professional development, designed to target IEP goal construction, can be an effective intervention in regards to improving the quality of IEP goals.

Similarly, in their study of performance outcomes for students with significant cognitive disabilities, Roach and Elliot (2006) recommended better training opportunities for special educators to improve their abilities to write standards-based IEP goals. The

impact that improvements in the design and alignment of IEP goals have on student learning and achievement were not addressed in this study. Special educators and IEP teams must develop a comprehensive understanding of the state's general curriculum standards in order to develop competence in the area of writing standards-based IEPs (Caruana, 2015; Cortiella, 2008). Browder et al. (2006) created a model framework designed to foster special educators' access to the general education content and to the formulation of standards-based IEPs. These steps included (1) identifying the academic domains for planning, (2) identifying the state standards for the student's grade level, (3) planning with general educators to focus on typical materials, activities, and contexts, (4) planning alternate achievement targets and considering the students' symbolic level, (5) reviewing content and performance centrality, (6) enhancing the skills by applying long standing values, and (7) identifying pivotal skills for the IEP and balancing with other priorities (Browder et al., 2006). This process, which continues to represent the best practices associated with standards-based IEP construction, was recommended for those special educators who worked with students with significant cognitive disabilities, but the overall emphasis on accessing general education supports and balancing knowledge with student unique needs applies to all students.

The type of professional development associated with increasing IEP goal quality is less important than the actual availability of professional development for special educators on the standards-based IEP. Ahearn found that, in 2010, only 27 states provided professional development that targeted standards-based IEP construction and only 18 included general educators in these professional development activities. In a comparative study of three different professional development mechanisms (web-based

learning, workshop-only, and workshop coupled with peer coaching conducted online) designed to improve the quality of standards-based IEP objectives, Lowman (2016) determined that any type of professional development immediately improved the quality of objectives but that the workshop model yielded the longest lasting improvements. Their findings suggested that if standards-based IEPs do not meet essential quality standards, it is possible to devise a training regime to build the skills of those in the field to affect change in this area.

Given these findings, a primary research focus has been on efforts to improve IEP design and quality, according to certain indicators of best practices in IEP development. Smith (2016) investigated whether a statewide professional development program yielded stronger, more data driven, and more individualized IEPs. In this study, Smith used a rubric with "categories [to] assess the quality of the IEP in the following areas: student strengths, parental input, assessment content and variety, statement of the disability's impact, other educational needs, participation in extracurricular activities, and goal quality" (p. 18). While Smith made recommendations regarding IEP training programs to increase IEP quality, the study did not address the impact that a quality standards-based IEP had on student achievement.

Controversies. Despite evidence of improved achievement for students with disabilities who engage with core curricular content in the general education setting, and the evidence that students with disabilities can learn content related to grade level standards, special educators have been incredibly reluctant to align IEP goals with content standards (Rea, McLaughlin, and Walther-Thomas, 2002; Mastropieri and Scruggs, 2006; Ayres et al., 2011). They often argue aligned educational programs are

not unique or appropriate; a claim that is proving especially problematic in an educational context now shaped by the necessity of improving student achievement. Some educators opine that, while comprehensive and well intentioned, the standards-based IEP initiative goes too far in linking access to equitable educational opportunities with attainment of positive student outcomes. Kurth and Mastergeorge (2010) determined many teachers believe establishing connections to the general education curriculum is less important for students with significant cognitive disabilities, such as autism, than for students with high incidence disabilities, which has frequently resulted in instruction based on alternative content for those students with significant cognitive disabilities. In a qualitative study of Louisiana teacher perceptions of the efficacy of standards-based IEP goals that was hampered by a low response rate, Smith (2013) found the majority of teachers ignored grade level expectations in order to address students' individual needs. Not everyone is convinced, even now, that all students can learn to a high level and that the "all students, all standards" mandate is even achievable (McDonnell, 1997).

Admittedly, given its unilateral focus on facilitating the same outcomes for all students, Maine's Policy on Standards-Based IEP Goals leaves little room for a recognition of disability related differences, or for consideration of how to best implement the Free Appropriate Public Education standard. Maintaining access to a wide range of educational opportunities for all students is federally mandated, but the expectation that all students will meet a universal standard of achievement is considered, in many circles, unrealistic and inappropriate. Ayers et al. (2011) emphasized the implications of such expectations when recounting the comment of a frustrated parent of

a student with disabilities in an IEP meeting, who stated, "My son can identify Saturn but he still can't request a snack or even wipe his ass" (p. 12).

Many educators argue the heightened focus on increasing student achievement through the alignment of IEP goals with the standards is incompatible with the adequate preparation of students for life after graduation. They are concerned that other, equally important, functional and developmental skills are ignored (Longo, 2002). These individuals believe standards-based IEPs may be facilitating an era of less "appropriate" educational programs, which, in their focus on preparing students for academic achievement and other federal accountability measures, do not address students' unique needs.

Hunt, McDonnell, and Crockett (2012) noted the standards-based IEP movement has ushered in an era in which assessments are driving IEP construction and some IEPs are no longer individually tailored to meet student needs. They specifically referenced the lack of research evaluating "the impacts of students' participation in the general education curriculum and alternate assessments on either their short-term academic achievement or long term postschool outcomes" as indication for a need to revise current approaches to standards-based programming (Hunt et al., 2012, p. 140). Striking a balance between the purpose of public education and the individual needs of students remains, according to McDonnell et al. (1997), "an enduring challenge" (p. 25).

Standards-Based IEPs and Student Outcomes

Students with significant cognitive disabilities. In their examination of longitudinal outcomes for students with significant cognitive disabilities who had been taught grade level standards, Ayres et al. (2011) found "some impressive results" (p. 14).

Concerns remained in regards to whether programs for students focused on general education standards could also effectively address their functional needs in the areas of consumer skills, community skills, and self-help skills (Ayres et al., 2011). Wehmeyer (2006) concurred in his warning that a true barrier to high quality educational programs for students with disabilities is the narrowing of the general education curriculum to include only core academic content, despite evidence that students can access said content.

Connecting the mandates of the standards-based IEP initiatives with practice and outcomes for students with significant cognitive disabilities has proven difficult. Karvonen and Huynh (2007) presented evidence of the disconnect between student IEPs and specially designed instruction and academic standards. In their study of archival data that included alternate assessment scores and coded IEP data for 292 tenth grade students with significant cognitive disabilities, Karvonen and Huynh (2007) determined standards-based IEP alignment had a moderate effect on student reading test scores on the alternate assessment, but not on student math test scores. There is a possibility that the relationship between IEP characteristics and alternate assessment scores could have been affected by the students' disabilities, 51.7% of whom were classified as having moderate mental disabilities, 18.5% of whom were classified as having mild mental disabilities, 12.0% of whom were classified as having autism, and 17.8% of whom were classified under other categories. However, all students in this study took the alternate assessment, which IDEA (2004) mandates for only those students who cannot participate in general education assessments, even with accommodations. As a result, Karvonen and Huynh (2007) note caution is warranted in drawing conclusions from these findings as the

correlation, or lack thereof, between student assessment scores and IEP characteristics may differ for students with high incidence disabilities subject to general education curriculum, instruction, and associated assessments. Additionally, the findings of Turner, Baldwin, Klevent, and Kearns (2000) study did not support a relationship between the quality of students' IEPs and their alternate assessment scores.

La Salle, Roach, and McGrath (2013) conducted a study to investigate the quality of IEPs and provision of curricular access for children with disabilities through an examination of the relationship between the percentage and quality of standards-based IEP goals, and teacher reported curricular access for students with disabilities. Their purposive sample of IEPs submitted by 130 teachers throughout the state of Indiana was skewed towards teachers with high levels of experience (an average of 13.9 years). Further, an additional possible limitation of the data set resided in the fact that the sampled IEPs were exclusively for low-achieving students who would likely take the state's alternate assessment. The majority of the students in the study were white males in grades K-12 eligible for special education services under the identification category of Specific Learning Disability; however, the frequency of other disabilities in the sample was representative of the frequency of disabilities throughout Indiana.

La Salle et. al. (2013) used a curriculum indicators survey and an IEP analysis tool to evaluate data related to student placement and IEP goals, and subsequently analyzed the results using descriptive statistics. Of those IEPs sampled, 73% had three to four academic goals aligned with standards, which were of variable quality throughout grade spans. Those IEPs for elementary students were more academically focused. Further, the actual quality of the IEP goals "demonstrated a very limited relationship to

students' large-scale test performance," curricular access, and inclusion (p.141). La Salle et. al. (2013) emphasized the concerning nature of these results, given the large-scale promotion of standards-based IEPs as pathways to curricular access and improved student achievement.

Similarly, Monica Smith-Woofter (2010) conducted a descriptive case study to assess North Carolina's educators' perceptions of the impact of alternate assessments and standards-based IEPs on classroom instruction and student achievement. Smith-Woofter (2010) used a limited sample of the state's educators, as she interviewed eight middle school teachers and six administrators from two school districts, and also conducted a blind archival analysis of IEPs. Results of this study indicated teachers believed standards-based IEPs drove classroom instruction and high expectations for children with academic disabilities, but lacked any quantification of student achievement in traditional terms. Notably, Smith-Woofter (2010) clarified that her research began as a mixed methods study designed to include an analysis of student test scores in the target student population, but she later abandoned this component of the research because the scores were unavailable. As articulated in Smith's 2013 study of teachers' perceptions of standards-based IEP goal effectiveness, empirical research in this area is limited; the actual efficacy of standards-based IEP goals is, as of yet, "undetermined" (p. 71).

Generally speaking, then, there is a dearth of empirical research related to the development, implementation, and effectiveness of standards-based IEPs, particularly in terms of current, societally approved measures of student achievement. For example, Browder, Spooner, Wakeman, Trela, and Baker (2006) synthesized their research on aligning instruction for students with significant cognitive disabilities with the state's

academic content standards in the areas of current policy, evidence-based practice for academic learning by this specific student population, the nature of standards, the role of general education, and the concept of alignment. They did pair their synthesis with studies on specific interventions designed to prove students with significant cognitive disabilities could acquire grade level skills. However, these studies were notably limited by a lack of social validation, were conducted in self-contained special education settings, and included a limited number of participants (single-subjects). As a result, Browder et al. (2006) were frank in their admission that additional research needed to be conducted in order for their findings to have any evidence base. This situation replicates itself throughout efforts to identify and review research related to the student achievement outcomes associated with standards-based IEPs. While there are many theories regarding whether or not standards-based IEPs are effective, and frequent efforts to synthesize associated data and policies, there exists little conclusive, empirical research that proves or disproves the connection between standards-based IEPs and student achievement.

Summary

Despite the regulatory, moral, and logistical importance of determining the significance of the impact of state compliant standards-based IEPs on the achievement in math and reading of students with high incidence disabilities, there remains a relative dearth of research in this area. The review of the literature reveals the standards-based IEP mandates in Maine and elsewhere evolved from a policy framework that developed according to an ideological perspective grounded in the moral need to ensure students with disabilities were afforded both equality of access and equality of opportunity within the realm of public education. This need was illuminated by the continued low levels of

achievement of students with disabilities as indicated by nationwide assessment and accountability measures mandated by NCLB and IDEA.

To foster enhanced student opportunities to access and make progress in the general education curriculum, policy makers focused on ensuring students with disabilities were included in the least restrictive environment with their peers, as appropriate. However, the reluctance of both special and general educators to shift their practices, and mindsets, regarding the potentials of students with disabilities led to the standards-based IEP movement. Despite the initiative's lack of associated research and outcome data, the complexities and controversies associated with standards-based IEPs quickly thrust them to the center of the special education policy field. In Maine, in particular, this movement coincided with the state's adoption of the Common Core State Standards and the Proficiency Based Diploma Law as it represented a clear path, at least in policy makers' minds, towards achieving the Law's "all students, all standards" mandate.

However, beyond their designated focus on special education student opportunities and outcomes, standards-based IEP policies also affect special educators' abilities to design and implement appropriate individualized programming, student inclusion in the least restrictive environment, and special educator attrition rates. Given these wide-reaching impacts, the need for empirical research designed to assess the impact of Maine state compliant standards-based IEPs on the achievement of students with disabilities in math and reading is essential. Federal and state mandates that guide the implementation of special education services must be constructed to ensure they do, in fact, enhance student achievement.

Chapter Three: Methodology

Introduction

This chapter presents a detailed overview of the quantitative research design selected for this study and identifies the reasons for the selection of said design. More specifically, this chapter includes information about the sample, the study's instruments, data collection and analysis methods, and limitations and delimitations of the study. Notably, the data for this study was obtained from public, non-charter Maine school administrative units.

Purpose statement. Despite the prevalence of standards-based IEP mandates in Maine and numerous other states, and the significance of their impact on practice and policy in special education, relatively few studies have been conducted to investigate the effects standards-based IEPs have on the achievement of students with high incidence disabilities. The purpose of this two stage quantitative study was to, through an analysis of covariance, measure the significance of the impact of Maine state compliant standards-based IEPs on the achievement of students with high incidence disabilities in math and reading as measured by the Northwest Evaluation Association Measures of Academic Progress assessment. Study results were subsequently examined through a public policy lens in order to propose how outcomes, and future associated research, might inform policy decisions pertaining to standards-based IEP mandates in Maine and elsewhere.

Rationale for quantitative design. Quantitative research grounded in the postpositivist research paradigm stipulates that causes determine effects; associated studies reflect the need to identify and assess the specific causes that influence outcomes, and to measure and reflect these data numerically (Creswell, 2014). Phillips and Burbles

(2000) note quantitative research seeks to develop truths that explain casual relationships through the identification of variables and rejection or failure to reject associated hypotheses. In addition, according to Creswell (2014), certain types of social research problems call for certain types of research methods; for example, "if the problem calls for [assessing] the utility of an intervention" or to "test a theory or explanation," then a "quantitative approach is best" (p. 50).

This quantitative study relied on a two-stage design in order to determine the significance of the impact of an intervention -- state compliant standards based IEPs -- on specified outcomes -- achievement of students with disabilities in math and reading. Specifically, the study examined if there was a significant difference between Maine state compliant standards-based IEP rating and percentage of student growth target attainment in math and reading on the Northwest Evaluation Association (NWEA) Measures of Academic Progress assessment, while controlling for student disability and least restrictive environment percentage.

Quantitative methods are also justified in accordance with the need to develop studies that produce generalizable results. Statistical significance contributes greatly to determining the generalizability of research results within the limits of random error; Holton and Burnett (1997) noted a significant advantage of quantitative methods is their ability to use smaller groups of people to make inferences about larger groups. Existent research on standards-based IEPs has focused primarily on students with low incidence disabilities whose performance, due to the nature and low frequencies of their disabilities, is not representative of the larger population of students with disabilities. As such, quantitative research focused on representative sample sizes of students with high

incidence disabilities will foster increased generalizability of findings related to standards-based IEPs and student achievement.

The decision to employ a quantitative methodology also related to the significant lack of quantitative research designed to measure the significance of the impact of standards-based IEPs on the achievement of students with high incidence disabilities. Recent qualitative studies, such as T. Smith's (2013) research on teachers' perceptions of the efficacy of standards-based IEP goals or S. Smith's (2016) research on the effectiveness of the statewide standards-based individualized education program initiative, do provide some qualitative insights regarding the efficacy of standards-based IEPs. There exists minimal quantitative research regarding the degree to which standards-based IEPs impact the achievement of students with high incidence disabilities. The employment of this quantitative research design to measure the significance of the impact of Maine state compliant standards-based IEPs on student achievement in math and reading was, therefore, specifically designed to enhance understanding in the field regarding the student outcomes associated with the implementation of these practices.

Description of type of quantitative design. This nonexperimental, causal-comparative quantitative design ascertained the significance of the relationship between the compliance of purposively sampled standards-based IEPs with Maine state expectations and the level of student achievement as indicated by growth target attainment on the NWEA MAP assessment in math and reading. These data were subjected to an analysis of covariance (ANCOVA) that determined the significance of the relationship between the independent variables of student IEP Maine state compliance rating, the covariates of the student's disability and least restrictive environment

percentage, and the dependent variable of the student's achievement as measured by the student's percentage of attainment of growth targets on the Northwest Evaluation Association (NWEA) assessment in math and reading. Descriptive data analysis was conducted as it pertained to the various sub-components of the standards-based IEP compliance ratings.

Methodology

Research questions. The overarching question guiding this study is: What is the significance of Maine state compliant standards-based IEPs on the academic achievement of students with disabilities? Specific questions include:

1) Are there evident patterns in compliance of subcomponents of standards-based IEPs as measured by Maine's General Supervision System Monitoring Tool?
2) Is there a statistically significant difference between the math achievement of third grade students with disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?
3) Is there a statistically significant difference between the reading achievement of third grade students with disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

Hypotheses. The following hypotheses represent the impetus for designing and conducting this study, and were tested at the alpha = .05 level of significance.

H_A = If the IEPs of third grade students with the high incidence disabilities of Specific Learning Disability or Other Health Impairment meet Maine State compliance

standards, then students will demonstrate higher levels of achievement in math as measured by percentage of growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards.

$H_{0 =}$ If the IEPs of third grade students with the high incidence disabilities of Specific Learning Disability or Other Health Impairment meet Maine State compliance standards, there will be no significance difference between the achievement of students with disabilities in math as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards.

$H_A =$ If the IEPs of third grade students with the high incidence disabilities of Specific Learning Disability or Other Health Impairment meet Maine State compliance standards, then the students will demonstrate higher levels of achievement in reading as measured by percentage of growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards.

$H_{0 =}$ If the IEPs of third grade students with the high incidence disabilities of Specific Learning Disability or Other Health Impairment meet Maine State compliance standards, there will be no significance difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards.

Operational definitions. For the purposes of this study, the following definitions are advanced:

Least Restrictive Environment Percentage: the percent of time a student spends with non-disabled peers during his or her school day as indicated in Section 9: Least Restrictive Environment of each Maine state IEP

Student Achievement: the percentage of student growth target attainment as calculated through a comparison of points in student RIT growth from Fall 2017 to Spring 2018 and the student's growth projection in RIT points as calculated by NWEA, both of which are indicated on the MAP Student Progress Report

State Compliant IEP: Maine state IEP that meets the majority of specifications for standards-based IEP goals as specified by ratings the Maine Department of Education's General Supervision System Public School Monitoring Tool and subsequently categorized by the Standards-Based IEP Stage Compliance Rubric created for this study

Student Disability: the disability category under which the student is eligible for special education and related services under the requirements of the IDEA and MUSER

Sample and sampling procedures. At this juncture, the majority of research on standards-based IEPs has focused on the achievement of students with low incidence, significant cognitive disabilities, such as intellectual disability (formerly known as mental retardation) or autism. According to the Maine Department of Education (2017), 2.5% of Maine students with disabilities are eligible for special education services under the category of intellectual disability and 9.5% of students are eligible under the category of autism. McDonnell et al. (1997) determined any "meaningful discussion of standards, curriculum, assessment, and outcomes cannot occur without thoughtful consideration of the varied characteristics of the large and diverse number of students with disabilities. The nature of the participation of students with disabilities in the common aspects of

standards-based reform is likely to vary depending on their individual characteristics and educational needs" (p. 123). These needs range from the selected academic content and the educational setting for instructional delivery to the student's participation in a state's regular or alternate assessment. Research findings pertaining to students with low incidence, significant cognitive disabilities are not generalizable to the experiences of the majority of students with disabilities. It is necessary, therefore, to identify a representative, statewide sample of students with high incidence disabilities that will allow for increased generalizability of research findings to populations of students with disabilities throughout the state of Maine.

Maine has 188 school administrative units (SAUs), all of which are mandated to provide services to students with disabilities (Maine Department of Education, 2016) (see *Appendix A*). Of these 188 SAUs, 120 use the NWEA MAP assessment to assess student learning; 72 of these SAUs have an enrollment of 500 or more students, while others have a total enrollment under 500 (S. Maginnis, personal communication, April 2017). For confidentiality reasons, the NWEA organization was unwilling to disclose which Maine SAUs administer the NWEA MAP assessment (S. Maginnis, personal communication, April 2017). As a result, data was solicited from special education administrators in all Maine SAUs, excepting those administrators associated with public charter schools.

Due to the current configuration of Maine law, the Maine Charter School Commission has authorized nine of the ten permitted charter schools in the state. According to the *Annual Report to the Commissioner* (2017), six of the nine charter schools serve students in grade 6 or higher, while the other three schools serve students in

grades K-3, preK-12, and preK-5. The charter schools are public schools, and must enroll students based on lottery or a first come, first served basis, and, excluding the two virtual schools, tend to have high populations of students with special needs. Excluding the two virtual schools, the seven "brink and mortar" charter schools reported in 2017 that approximately 30% of their students required special education services (University of Maine, 2017). However, since their only source of funding is through the state, charter schools often struggle to provide adequate services and supports in this realm. Additionally, public charter schools are designed to offer an alternative to the traditional public school, and, as such, are not held to the same standards and specifications as traditional public schools. For example, under state law, charter schools have more rigorous academic standards and more explicit growth goals than traditional public schools and can configure their calendars as they so choose (Gallagher, 2017). Further, as stated by the Maine Department of Education (2014), state laws that apply to school administrative units do not apply to public charter schools unless explicitly noted in the charter school chapter. Given the presence of these variables, cases for the purposes of this study were requested from Maine's non-charter public schools in the state's administrative units.

Special education administrators from the identified 188 SAUs were contacted via email, and/or telephone using the Maine Administrators of Services for Children with Disabilities (MADSEC) listserv. (See *Appendix B* for request letter). They were asked to contribute four sets of redacted case materials, each representative of a different student, for the purposes of this research. According to the Family Educational Rights and Privacy Act (1974), special education administrators have access to student IEPs and

achievement test scores due to their "legitimate educational interests" in the students' programs. As a result of their job related responsibilities, which include the capacity to "plan, organize, and direct implementation of all special education activities," "oversee the completion and maintenance of all appropriate special education records and reports; local, state, and federal," and "supervise the maintenance of accurate records on student progress and attendance," special education administrators have access to contents of all files of students with disabilities in their SAUs (Cape Elizabeth School Department, 2016, p. 2-3). Further, in order to protect the identities of those students whose IEPs and NWEA scores were submitted for this study, participating special education administrators were asked to de-identify all documents and data prior to their submission. A maximum of four cases per SAU were solicited for the purposes of this study.

Each case consisted of a student's standards-based IEP and a student's NWEA MAP Student Progress Report from the 2017-2018 school year. The cases were a subset of the population of third grade special education students in Maine's public, non-charter schools. Descriptive data, including student disability and least restrictive environment percentage, were obtained directly from submitted IEPs. In order to ensure the cases within this purposive sample were selected randomly, special education administrators were asked to submit, in each of the two identified eligibility categories, one student with a last name between the letters A and M and one student with a last name between N and Z. Additionally, special education administrators were asked to submit case materials that had been created by different special education case managers (Roach and Elliot, 2006).

The sample of cases included third grade students eligible for special education services under the two most common disability categories of Other Health Impairment and Specific Learning Disability. As depicted in Table 1.1. *Maine Students with Disabilities in Grades K-12 by Exceptionality,* according to the Maine Department of Education's Data Warehouse (2017), Maine students are eligible for special education services with certain identified frequencies of disability.

Table 1.1

Maine Students with Disabilities in Grades K-12 by Exceptionality

Exceptionality Category	**Percentage of Students**
Autism	9.5%
Deaf Blindness	-
Deafness	0.1%
Developmentally Delayed	0.6%
Emotional Disability	7.5%
Hearing Impairment	0.3%
Intellectual Disability	2.5%
Multiple Disabilities	10.0%
Orthopedic Impairment	0.2%
Other Health Impairment	21.2%
Specific Learning Disability	30.9%
Speech and Language Impairment	17.0%
Traumatic Brain Injury	0.1%
Visual Impairment Including Blindness	0.1%

Source: Maine Department of Education, 2015.

At the state level, according the Maine Department of Education (2017), 30,785, or 17.08% of the 180,258 total Maine students in grades Kindergarten through twelve, received special education services. More specifically, as noted in the April 2017 child count, 13,240 of those students attended third grade, and 2,499 of those students, or 18.87%, received special education services. Further, according to the National Center for Education Statistics, students eligible for special education services under the category of Specific Learning Disability represented 30.9%, or 9,358, of students with disabilities in Maine, and students eligible for special education services under the category of Other Health Impairment represented 21.2%, or 6,420, of students with disabilities in Maine; together these two, high incidence categories represent over 50% of students who receive special education services. Random samples were drawn from these two purposively sampled subgroups of special education disability categories within each participating SAU. These efforts were designed to result in the submission of an equal number of cases for students with Specific Learning Disabilities and for students with Other Health Impairments from SAUs that were representative of educational systems across Maine.

In addition to the specified eligibility categories, students in the sample must have attended grade three during the 2017-2018 school year, as students in this cohort met a number of key requirements. Students in grade three are in the typical age cohort of students who take the NWEA MAP assessment, which is generally administered to students in grades two through ten. Additionally, students in grade three had attended public school since the movement towards standards-based IEPs formally began in Maine.

During these students' kindergarten year, 2014-2015, the Maine Department of Education issued the first iteration of its Policy on Standards-Based IEP Goals. During these students' first grade year, 2015-2016, the Maine Department of Education revised, but maintained, its Policy on Standards-Based IEP Goals. During these students' second grade year, 2016-2017, the Maine Department of Education began monitoring cohorts of school administrative units for compliance with the Policy on Standards-Based IEP goals, and included standards-based IEP goal components in its General Supervision Support System Monitoring activities. During these students' third grade year, 2017-2018, all educators across Maine were required to create and implement standards-based IEPs, and were subject to continued monitoring for said compliance.

It follows that the majority of students with disabilities who attended grade three during the 2017-2018 school year consistently had been exposed to, on an informal or formal basis, standards-based IEP practices and had participated in the NWEA MAP assessment for at least two years. This purposive random sample was designed to yield a set of four cases from each participating SAU. Each set was comprised of materials associated with two third grade students eligible for special education services under the category of Other Health Impairment and two third grade students eligible for special education services under the category of Specific Learning Disability.

Notably, according to Faul, Erdfelder, Lang, and Buchner (2007) G*Power 3 Statistical Power Analysis Program, a representative sample of the population, with a moderate effect size of 0.25, an alpha level of 0.05, a Power of 0.80, and two covariates, would be 269 students ($n = 269$) (Faul et al., 2007). To achieve this sample size, a

minimum of special education administrators from 68 of the identified 120 Maine SAUs administering the NWEA would have had to submit requested cases.

Data Collection

Instrumentation.

Maine Department of Education's General Supervision System Public School Monitoring Tool. There exists a strong federal presence in special education in the form of accountability compliance monitoring to determine school and SAU adherence to the specific procedures, timelines, and processes (McLaughlin and Thurlow, 2003). Accordingly, the Maine Department of Education (2016) is required under federal law to monitor special education programs and services for students with disabilities as described under 2004 Amendments to the IDEA. The monitoring process dictates that each SAU select 20% of its IEPs for self-assessment and the Department of Education subsequently assess an additional predetermined 10% of the SAU's IEPs using to determine SAU compliance with state and federal mandates (Maine Department of Education, 2016). School administrative units must earn 100% compliance on both the self-assessment and Maine Department of Education assessment of IEPs in each area in order to avoid corrective action.

As a small component of this process, the Maine Department of Education must assesses IEP compliance with the state's IEP requirements using the IEP process component of the State's 'General Supervision System Public School Monitoring Tool (GSS Monitoring Tool).' Beginning in 2016-2017, as a result of its Policy on Standards-Based IEP Goals, Maine's Department of Education GSS Tool incorporated standards-based IEP components associated with evaluating SAU adherence to standards-based IEP

requirements. These include 'IEP Process: Academic Performance' indicators and 'Standards-Based Goals' indicators, both of which are used to measure IEP compliance with the Policy (Maine Department of Education, 2016). (See *Appendix D*). These indicators, which must be rated with to a "Yes" or "No" response include:

- APG1 – Results of the Initial or Most Recent Academic Evaluation of the Child;
- APG2 – Academic Strengths of the Child;
- APG3 – Academic Needs of the Child;
- APG4 – A Statement of Child's Present Levels of Academic Achievement, Including How the Child's Disability Affects the Child's Involvement and Progress in the General Education Curriculum;
- SBG1 – IEP includes academic goals aligned with the student's needs and present level of academic performance, and designed to facilitate the student's achievement of grade level (or grade span) Maine Learning Results;
- SGB2 – IEP academic goals are formatted by (what date), given (conditions), student will (do what observable behavior), as measured by (assessment or other);
- SBG3 – IEP academic goals are measurable (include data or activities to be measured by score, percent, frequency, or specific demonstration of mastery);
- SBG4 – IEP academic goals have a citation linking them to grade level (or grade span) general education curriculum standards. (Maine Department of Education, 2016)

While the GSS Monitoring Tool has not been scientifically validated, the Department has established acceptable levels of inter-rater reliability among its monitoring staff, and has consistently used the GSS Monitoring Tool to both investigate and assess SAU compliance with the Policy on Standards-Based IEP Goals. In this study, the Tool was used in a corresponding manner - collected standards-based IEPs were co-rated using the

Tool's standards-based IEP components to determine their level of compliance with Maine's Policy on Standards-Based IEP Goals.

Standards-Based IEP Stage Compliance Rubric. La Salle, Roach, and McGrath (2013) constructed an IEP analysis tool to investigate the quality of Individualized Education Programs and their influence on academic achievement, inclusion in general education classrooms, and curricular access for students with low incidence disabilities. La Salle et al. (2013) based their tool on guidelines for creating standards-based IEPs published by the National Association of State Directors for Special Education in 2007, and "included 4 items which asked raters to evaluate the extent to which each IEP goal (a) aligned with state standards, (b) provided data on presented present level of performance, (c) identified student's educational needs, and (d) described methods for documenting student progress" (p. 138).

In accordance with this process, after IEPs collected for this study were assessed for compliance, results were interpreted using the Standards-Based IEP Stage Compliance Rubric. This Rubric was created for this study based on both the GSS Monitoring Tool and the Maine Policy on Standards-Based IEP Goals. (See *Appendix E*). This Rubric was used to assign a categorical value associated with each IEP's level of state compliance on a 4-point Likert scale that included:

1. Emerging Stage, Non-Compliant;
2. Progressing Stage;
3. Partial Mastery Stage;
4. Mastery Stage, Fully Compliant.

NWEA Measures of Academic Progress Student Progress Report. According to Beaudry and Miller (2016), student test scores are one of the most commonly used measures for data collection. In this study, student achievement was assessed using the percentage of student growth target attainment in math and in reading on the NWEA MAP assessment from Fall to Spring of the 2017-2018 school year. This untimed evaluation, which is a computer adaptive interim assessment spanning kindergarten to grade eleven, is typically used in Maine SAUs at least twice a year to assess the reading and math performance of students. Further, the NWEA MAP assessment allows educators to "measure the growth of every student over time regardless of on, above, or below grade level performance – and even if standards change" (Northwest Evaluation Association, 2017).

NWEA MAP Student Progress Reports typically depict a student's overall progress in historical terms so educators and parents can communicate about the student's term to term growth (NWEA, 2017). Data on the Report can include the term/year the test was taken, student grade when the test was completed, student RIT score with associated standard error, RIT growth between the two identified terms in the growth comparison period, the growth projection based on the average growth of students who were in the same grade and began the same term at a similar RIT score, and percentile range, as well as a graphical depiction of student performance. Reports also include specific goal descriptors in subsets of the identified academic domains, which are rated as "Low", "Low Avg," "Avg," "HiAvg," and "High," according to student performance.

Growth norms associated with student scores are based on the 2015 RIT Scale Norms Study, which was based on randomly selected kindergarten through grade eleven

grade level samples, each consisting of 72,000 to 153,000 student test records, from approximately 1000 schools in the United States (Northwest Evaluation Association, 2017). Growth projections reflect the common observation that the rate of a student's academic growth is related to his or her starting status on the measurement scale; students who start at a lower level tend to grow more (Northwest Evaluation Association, 2017). Students who make progress that is at least commensurate with that of their peers will meet their growth projection targets, as indicated by the level of RIT growth on their NWEA MAP Student Progress Reports.

For the purposes of this study, MAP Reports were used to identify the student's Fall 2017 RIT score, Spring 2018 RIT score, growth projection, and actual RIT growth between the Fall 2017 term and the Spring 2018 term. Actual RIT scores or percentile ranks were not used to exclusively assess student achievement due to the unique factors contributing to the performance of special education students. In order to be eligible for special education services, students must demonstrate adverse effect, which, according to the Maine Unified Special Education Regulations (2017), is defined as

> having a negative impact that is more than a minor or transient hindrance, evidenced by findings and observations based on data sources and objective assessments with replicable results. An adverse effect on educational performance does not include a developmentally appropriate characteristic of age/grade peers in the general population. (p. 3)

Those students with disabilities who are eligible for special education services demonstrate academic performance that is not commensurate with their peers; their scores on assessments are typically lower than expected for their grade or age level.

Buzick and Laitusis (2010) recognized the use of growth in accountability and achievement measures is particularly important for students with disabilities who are receiving standards-based instruction and participating in federal accountability assessments but are still performing, on average, far below their regular education peers. Using raw RIT scores or percentile ranks, therefore, would reflect student achievement in comparison to students in their assigned grade, but would not reflect student growth from their previously established performance level. Growth targets are recognized as an achievement measure that, if they are rigorous and associated with long-term planning, can ultimately close achievement gaps and foster student attainment of proficiency (American Institutes for Research, 2015). In order to accurately represent achievement, therefore, student achievement was measured in this study through the use of a calculation of the student's growth target attainment on the NWEA MAP assessment in the designated content areas.

Validity and reliability of instruments.

Maine Department of Education's General Supervision System Public School Monitoring Tool. Devon, Block, Moyle-Wright, and Ernst (2007) recognize that the validity of utilized tools is essential for assuring the integrity of study findings. They define validity as "the ability of the instrument to measure the attributes of the construct under study" (p. 155) and reliability as "the ability of an instrument to measure an attribute consistently" (p. 156). According to the current Maine State Department of Education's Director of Special Education Jan Breton, the GSS Monitoring Tool has "never been put through a validation process" (personal communication, August 2017). However, given its usage by Maine's Department of Education's GSS Monitoring team,

the GSS Monitoring Tool has been established as a "measure of the intended construct," which in this case is the compliance of standards-based IEPs with Maine's Policy on Standards-Based IEP goals (Devon et al., 2007, p. 163). The population sampled for this study is a subset of the "population sampled when the instruction was developed" (Devon et al., 2007, p. 163). Reliability of the GSS Monitoring Tool was subsequently established through the inter-rater reliability process.

NWEA Measures of Academic Progress Student Progress Report. The NWEA organization cites ongoing studies and analyses such as "pool depth analysis, test validation, comparability studies, and Differential Item Functioning (DIF)" as part of their efforts to ensure the test's reliability and validity (Northwest Evaluation Association, 2018). In addition, the design the NWEA uses established vertical scales and item banks based on IRT methodology, which is often used in test development to improve the accuracy and reliability of results, particularly for those individuals with disabilities (Reid, Kolakowsky-Hayener, Lewis, and Armstrong, 2007). IRT methodology's associated properties of:

- The item difficulty calibrations are sample free;
- The achievement level estimates are sample free;
- The item difficulty values define the test characteristics (Tindal, Schulte, Elliot, and Stevens, 2004, p. 26)

allow for the development of valid measurement scales in reading and math that encompass multiple grade levels. The NWEA's use of the IRT Rasch model, which provides for sufficiency, separability, specific objectivity, and latent additivity,

subsequently provides a common scale against which all users can be measured (Wang, McCall, Jiao, and Harris, 2013).

Content validity in such assessments is also essential to test validity. In NWEA item development, Wang et al. (2012) found "all items match the assessable sections of academic content standards both in breadth of content and depth of knowledge" and are "aligned to specific state content standards by assembling pools of items that address state content standards" (p. 92). These researchers confirm that NWEA notes the marginal reliabilities of the tests across the fifty states and student grades are consistently in the low to mid 0.90s (Wang et al., 2012).

The NWEA is also recognized as a valid indicator of student performance on other assessments. In March 2010, later revised in January 2016, NWEA studied the alignment of their assessment with the New England Common Assessment Program in order to help schools in Maine, New Hampshire, Rhode Island, and Vermont better predict student performance on that state assessment using NWEA MAP assessment scores. While the objectivity of such research may be in question, as it was conducted by the publisher of the assessment itself, Andren, in a 2010 quantitative doctoral study, confirmed that the reading MAP assessment was the best predictor of performance for the student's Maine state assessment (NECAP) scores, and, in fact, had "more predictive power for students who are at risk for reading problems than for the general student population" (p. 19). Although Maine's student assessments have been frequently changed since 2010, the recognition that the NWEA MAP assessment can predict student performance on other 'high stakes' achievement measures is confirmed. As evidenced

here, the NWEA MAP assessments are widely accepted in Maine as valid and reliable measures of student progress, and achievement.

Data collection procedures. Special Education Administrators from Maine school administrative units administering the NWEA were contacted by email and/or phone in the summer of 2018 to request data. Subsequent to their agreement to participate, the administrators were asked to submit a set of four case materials. These collection methods yielded a sample of 72 cases ($n = 72$); due to partial samples submitted by some SAUs, the sample consisted of 53.33% of cases that were third graders eligible under the category of Specific Learning Disability and 46.67% of cases that were third graders eligible under the category of Other Health Impairment.

Each set of case materials included two pieces of data; the student's most recent Individualized Education Program, associated with the 2017-2018 school year, and his or her concurrent NWEA MAP Student Progress Report for math and reading. Descriptive data, including student disability category and least restrictive environment percentage, were collected directly from student IEPs. Further, the study attempted to include the variable of student longevity in the submitting school system but was ultimately unable to incorporate this information due to the majority of respondents' failure to submit these data. Submitted IEPs and NWEA MAP Score Reports were redacted by special education administrators prior to submission such that no individually identifiable information was present. Submitted IEPs that contained any identifiable information were immediately destroyed. Collected standards-based IEPs were co-rated using the standards-based IEP components of GSS Monitoring Tool and the Standards-Based IEP Compliance Stage Rubric to determine their level of compliance with Maine's Policy on

Standards-Based IEP goals. Summative standards-based IEP compliance ratings were obtained by calculating the numerical percentage of adherence to all expectations as set forth on the IEP Process Component of the GSS Monitoring Tool using the afore-mentioned Rubric. Scores on the various subsections of the IEP Process Component of the GSS Monitoring Tool were used in the investigation of characteristics of IEP compliance with standards-based IEP expectations in the academic and standards-based IEP goal realms.

Each student's most recent 2017-2018 Fall and Spring NWEA MAP score report was obtained and reviewed to identify the student's baseline of performance, as indicated by the student's Fall RIT score in each content area, as well as to identify percentage of student growth target attainment from Fall to Spring. Percentage of student growth target attainment was obtained by identifying the student's growth on the NWEA assessment from the Fall to Spring terms and comparing this value to the predicted value through a percentage calculation.

Student disability categories and least restrictive environment percentages, and all other descriptive data, such as confirmation of student grade level, were obtained directly from the submitted standards-based IEPs.

Inter-rater reliability. Inter-rater reliability is defined as the level of agreement between a particular set of judges on a particular instrument at a particular time (Stemler, 2004). More specifically, the consensus estimate approach to establishing inter-rater reliability is based on the "assumption that reasonable observers should be able to come to exact agreement about how to apply the various levels of a scoring rubric" and is "useful when different levels of the rating scale are assumed to represent a linear

continuum of the construct, but are ordinal in nature" (Stemler, 2004, p. 2). Zirkel and Hetrick (2016) established interrater reliability in their systematic analysis of court decisions specific to IEP related procedural violations after the 2004 amendments of the IDEA. To do so, they independently coded successive random five-case subsamples of their sample of 132 cases, compared and discussed the results at each successive stage, and subsequently refined the rules of the coding protocol. Zirkel and Hetrick (2016) engaged in this process for seven successive iterations until they reached the requisite interobserver agreement of 90% for each column dual entry. Cases were then recorded by both raters according to the final version of the protocol to "optimize accuracy and uniformity" (p. 225).

In this study, IEP ratings were advanced by experienced special education administrators, one of whom serves as a special education administrator in a Maine SAU and has prior experience as a special educator in different SAU, and one of whom has five years of experience in a Maine SAU as well as prior experience as a special educator. A "percent agreement" approach to establishing consensus to estimate inter-rater reliability, in which percent agreement among the raters was calculated using co-scored IEPs, was used in this study (McHugh, 2012). This was appropriate due to the obtained small sample size, the limited number of raters, and the accuracy of rating. To establish the percent agreement, 20% of the collected sample (n = 72), or 15 of the IEPs, were randomly selected and co-scored by the identified raters using the GSS Monitoring Tool. The sum of the number of cases that received the same rating by both raters was divided by 15. An established level of inter-rater reliability of least 90% for ratings on the GSS Monitoring Tool was sought (Roach and Elliott, 2006).

The first round of co-scoring yielded a percent agreement of 80%, as the raters rated 12 out of the 15 IEPs with the same score. The raters discussed the three discrepant ratings at length in order to come to consensus on the most appropriate final rating (La Salle et al., 2013). Given these discrepancies, an additional randomly selected 15 IEPs were co-scored by the identified raters, and the sum of the number of cases that received the same rating by both raters was divided by 15. The second round of co-scoring yielded an acceptable percent agreement of 93.33%, as the raters rated 14 out of 15 IEPs with the same score. The raters discussed one discrepant rating at length and consensus was obtained. As an inter-rater reliability of 93.33% exceeded the standard of 90% initially set for this study, the primary researcher for this study scored remaining 42 IEPs.

Data Management

All documents were de-identified by special education administrators prior to submission. Submitted documents were organized, and stored, in a designated locked file cabinet in an office in a school district's Central Office building. Additionally, when no one is present in the office, the door is locked. Compliance ratings, and student achievement data were organized via the password protected Google suite software, and processed using SPSS software, both of which were accessible through a password protected computer. The computer additionally had a timed "lock out" screen saver that secured the computer after a short period of inactivity. Any documents received electronically were stored on an encrypted thumb drive, which was placed, when not in use, in the locked file cabinet with the case materials collected for this study. Collected raw data will be stored, per research regulations, for three years after the completion of

the study. After this time, all electronic storage mechanisms (thumb drive or google files) will be permanently deleted, and all paper copies will be destroyed.

Data Analysis

Descriptive data analysis was conducted to investigate characteristics of IEP compliance with standards-based IEP expectations in the academic and standards-based IEP goal realms. Further data analysis was conducted to determine if the compliance level of a student's standards-based IEP had a significant impact on the student's achievement in math and reading. The student's achievement was measured by his or her growth target attainment on the NWEA, while controlling for student disability and least restrictive environment percentage. It was predicted standards-based IEPs would have a significant impact on the achievement of students with disabilities in math and in reading. To test this prediction, an analysis of covariance was used to determine (1) the presence of any differences between groups on the dependent variable after controlling for the effects of other categorical or continuous variables, (2) the strength of the association between the variables, and (3) how much of the variance in percentage of student growth target attainment on the NWEA was explained by the independent variables.

Variables. Rojewski, Lee, and Gregg (2015) noted covariate selection seeks to identify prominent variables that may influence samples. Variables identified for inclusion in this analysis were selected as a result of an investigation of potential factors affecting the achievement of students with disabilities across grade levels. The dependent variables in this study included, therefore, student achievement in math and reading on the NWEA MAP assessment as measured by percent growth target attainment in each subject area. The independent variable included student standards-based IEP

state compliance rating. This rating was calculated first by assessing the student's IEP using the Maine Department of Education's GSS Monitoring Tool, and subsequently by translating this rating into a compliance measure using the Standards-Based IEP Compliance Stage Rubric. Covariates included student disability and least restrictive environment percentage. The following combinations of variables were utilized in the analysis of covariance in the area of math:

- Dependent Variable (DV) = Percent Growth Target Attainment, Math;
- Independent Variable (IV) = Disability (covariate);
- Independent Variable (IV) = Least Restrictive Environment Percentage (covariate);
- Independent Variable (IV) = Standards-based IEP overall state compliance rating.

The following combinations of variables were utilized in the analysis of covariance in the area of reading:

- Dependent Variable (DV) = Percent Growth Target Attainment, Reading;
- Independent Variable (IV) = Disability (covariate);
- Independent Variable (IV) = Least Restrictive Environment Percentage (covariate);
- Independent Variable (IV) = Standards-based IEP overall state compliance rating.

Analytical techniques. Collected data was entered into IBM's advanced statistical analysis Statistical Package for the Social Sciences (SPSS) software (IBM Corp. SPSS Statistics Premium Gradpack for Mac, Version 25). Descriptive statistics, including the mean values of percent growth target attainment on the NWEA, the mean of level of state compliance of standards-based IEPs, the mean least restrictive

environment percentage, and the means of scores on the various subcomponents of the GSS Monitoring Tool, as well as standard deviations associated with these data.

Analyses of Covariance (ANCOVA) were conducted independently for both math and reading to determine the significance of the impact that a standards-based IEP state compliance rating level (1-4) had on student achievement as measured by student percentage growth target attainment on the NWEA, while controlling for student disability and least restrictive environment percentage. Each ANCOVA's independent variable represented the standards-based IEP's overall state compliance rating according to the Standards-Based IEP Compliance Stage Rubric. The independent variable covariates were student disability and least restrictive environment percentage. Each ANCOVA's dependent variable represented the student's percent growth target attainment in the identified content area of math or reading. Data from all submitting school administrative units was examined in aggregate, both for the purposes of maintaining confidentiality and for the purposes of examining the significance of the relationship on a statewide scale. It was assumed, as stated in the alternative hypothesis, that if the IEPs of third grade students with the high incidence disabilities of Specific Learning Disability or Other Health Impairment met Maine state standards-based IEP compliance standards, then students would demonstrate higher levels of achievement in math or reading as measured by percentage of growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine state standards-based IEP compliance standards.

Subsequently, the data analysis followed the three-step process suggested in Beaudry and Miller (2016):

1. Determine the overall main effects with a calculated *F*-score and *p*-value;
2. Conduct analysis of covariance to determine if there are interaction effects;
3. Conduct follow up post hoc tests, including estimates of marginal means, for each of the possible combinations of treatment and control. (p. 167)

The total variance explained by the identified variables was examined to determine if they accounted for a statistically significant difference in percentage of student NWEA growth target attainment in each identified content area. Subsequently, the *p*-value of each of the identified predictor variables was reviewed to determine levels of significance of impact on student NWEA growth target attainment in math and reading. Further data analysis was conducted to investigate characteristics of IEP compliance with standards-based IEP expectations in the academic and standards-based IEP goal realms to determine compliance patterns in specific components of standards-based IEPs.

Testing hypothesis. Significance and hypothesis testing relate to the researcher's efforts to demonstrate the null hypothesis is true or to confirm that an alternative hypothesis is true (Beaudry and Miller, 2016). Cochran (1977) identified a procedure for determining sample size that is based on two key factors, as noted by Bartlett, Kotrlik, and Higgins (2001); the acceptable margin of error and the alpha level, which represents the level of risk the researcher is willing to accept that the true margin of error exceeds the acceptable margin of error. The alpha level used in most educational research studies is either .05 or .01 (Bartlett et al., 2001); Urdan (2017) confirms researchers typically use an alpha of .05 to measure statistical significance and, an alpha of $p \leq .05$ was used in this study. The sample criteria were selected to reduce the likelihood of a Type II, beta level error and to meet the requirements of a representative sample as specified by the

G*Power analysis program at a power of .80 and a moderate eta squared effect size *f* of 0.25 (Faul et al., 2007). However, the obtained sample size of 72 cases ($n = 72$) was not representative of the population, thus limiting generalizability.

Limitations and Delimitations

Key strengths of this study relate to its target population of students with high incidence disabilities who had attended school since Maine's institution of formalized standards-based IEP ideologies and practices in 2014. The sampling techniques were designed to create a data set that enhanced the study's external validity by ensuring the characteristics of the students were representative of SAUs throughout the state of Maine and of students with high incidence disabilities (Creswell, 2014). Other threats to external validity, such as those related to setting or time, were not present in this study, and thereby did not, in and of themselves, limit the study's generalizability.

Notably, as explained by Odom et al. (2005), special education researchers "cannot just address a simple question about whether a practice… is effective; they must specify clearly for whom the practice is effective and in what context. The heterogeneity of participant characteristics poses a significant challenge to research designs based on establishing equivalent groups, even when randomization and stratification is possible" (p. 139). Previous quantitative research studies in this area have focused primarily on students with low incidence, significant cognitive disabilities such as intellectual disabilities, who represent 2.5% of all students with disabilities, or autism, who represent 9.5% of all students with disabilities (Maine Department of Education, 2017). Findings associated with these populations of students are not generalizable to students with high

incidence disabilities, given their different cognitive capabilities and associated different achievement measures and expectations (Odom et al., 2005).

This study's sample was designed to represent the highest incidence eligibility categories as compared to Maine state frequencies: 52.1% of the total special education students in Maine are eligible under the top two, high incidence eligibility categories of Specific Learning Disability and Other Health Impairment (Maine Department of Education, 2017). Findings had the potential to address a significant research gap in regards to the relationship between the achievement of students with high incidence disabilities and standards-based IEP compliance.

However, although this research highlights important implications and questions for educators and policy makers, there are features of this study that indicate the need for caution. First, and most significantly, administrators from only 23 of Maine SAUs submitted either full or partial data sets, yielding an overall sample size of 72 cases (n = 72), which was 26.77% of the desired sample size. The small size of the obtained sample, therefore, limits the generalizability of the research findings.

The data request for this study specified submitted cases were to include randomly sampled students in third grade eligible under Specific Learning Disability or Other Health Impairment. However, no restrictions were placed on the selection of associated case managers, save for the request that submitted cases be managed by different special educators. A second limitation is that special education administrators, out of necessity or preference, may have submitted IEPs they perceived as more in compliance with state standards than others, thereby introducing a possibility of selection sampling bias. A third limitation concerns the GSS Monitoring Tool used to rate the

compliance of the standards-based IEPs, as it is not a scientifically validated tool. Although acceptable levels of inter-rater reliability have been established when the Tool is used during state monitoring activities, and were established amongst the raters in this study, the lack of a validated tool is problematic. A fourth limitation relates to the influence of other variables on the achievement of students with disabilities. While this study incorporated several of those variables, including student disability and least restrictive environment percentage, and controlled for several other variables, including student grade level, known to impact student achievement, there exist other influential factors not incorporated in this study that may have impacted the results.

Chapter Four: Findings

Introduction

This chapter begins with a brief overview of the basic components of this quantitative study, including its construct and procedures. It subsequently provides a description of the obtained sample for the purposes of establishing the context for the analysis and subsequent findings. Notably, the number of cases obtained for this study was far less than anticipated, which thereby limited the generalizability of the findings. The chapter details descriptive statistics pertaining to the identified variables, including growth target percentage on the math and reading NWEA MAP Assessments, least restrictive environment percentage, and standards-based IEP compliance measures. The results of the ANCOVAs are then presented.

Overview of the study. The purpose of this two stage quantitative study was to assess, through an ANCOVA, the significance of the impact of Maine state compliant standards-based IEPs on the math and reading achievement of third grade students with high incidence disabilities as measured by the NWEA MAP assessment. The overarching research question guiding this study is: Do state compliant standards-based IEPs impact the academic achievement of students with disabilities? Specific research questions included:

1) Are there evident patterns in compliance of subcomponents of standards-based IEPs as measured by Maine's General Supervision System Monitoring Tool?
2) Is there a statistically significant difference between the math achievement of third grade students with high incidence disabilities with Maine state compliant

standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

3) Is there a statistically significant difference between the reading achievement of third grade students with high incidence disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

The data for this study was sought directly from acting public special education administrators in Maine school administrative units. Due to SAU non-response to data solicitation efforts, SAU lack of student population meeting the specifications of the study, and SAU use of alternative formative assessment tools, the collected sample of 72 cases ($n = 72$) was far less than anticipated. Descriptive data pertaining to compliance of the sub-components of the GSS Monitoring Tool were examined to determine the presence of patterns of compliance among the standards-based IEPs submitted for this study. ANCOVAs were conducted independently for both math and reading to determine the impact that a standards-based IEP's level of compliance with Maine state expectations had on student achievement, when controlling for student disability and least restrictive environment percentage.

Sample Characteristics

The obtained sample size was far less than the sample size necessary to ensure the generalizability of the study. However, certain characteristics of the obtained sample did indicate that, while the study's results do not meet the standard for generalizability, the sample was, in and of itself, representative of the target population.

Sample criteria. Estimates calculated according to Faul, Erdfelder, Lang, and Buchner's (2007) G*Power 3 Statistical Power Analysis Program indicated that a representative sample of the population, with a moderate effect size of 0.25, an alpha level of 0.05, a Power of 0.80, and 2 covariates, would be 269 cases ($n = 269$). To achieve this sample size, a minimum of special education administrators from 68 of Maine SAUs administering the NWEA would each have had to submit the four requested cases.

Each requested case consisted of a student's standards-based IEP and a student's NWEA Measures of Academic Progress Student Progress Report from the 2017-2018 school year. The cases were a subset of the population of third grade special education students in Maine's public, non-charter schools identified under the two most common disability categories of Other Health Impairment and Specific Learning Disability. The sample parameters were designed to yield a sample size that would allow for the generalizability of the study's result to the Maine state population of students with high incidence disabilities.

At the time of the study's design, 120 of Maine's 188 school administrative units used the NWEA MAP assessment to measure student progress and achievement. The NWEA organization could not, due to confidentiality reasons, reveal the identities of those 120 school administrative units for the purposes of this research (S. Maginnis, personal communication, April 2017). Therefore, after approval and exemption for this study were granted by the Institutional Review Board, the request for data was submitted to all special education administrators from Maine SAUs. Charter schools were omitted

from this query due to the significant differences in oversight, accountability, and mission between charter schools and public schools.

Overall response configuration. 86 special education administrators, each of whom represented a different Maine public school administrative district, responded to the request for data. 59 administrators, or 68.60% of the total respondents, did not provide data, and four, or 4.65% of the total respondents, indicated they might provide the data at an unspecified time in the future. 23 administrators, or 26.77% of the total respondents, provided data. Of those respondents who provided data for the study, 8.05% of the total respondents or 30.44% of the submitting respondents, provided a partial sample, ranging from one to three cases, of the four requested cases, and 18.39% of the total respondents, or 69.56% of the submitting respondents, provided a full sample of the four requested cases. (See Table 4.1).

Table 4.1

Response Configuration Summary by Respondent Category

	Respondent Category				
	Did Not Provide Data	Unfulfilled Future Commitment to Provide Data	Provided Data		Total Respondents
			Full Sample	Partial Sample	
Number of Respondents	59	4	16	7	86
Percent of Overall Respondents	68.60%	4.65%	18.39%	8.05%	100%

Respondents by county. The state of Maine consists of sixteen counties, each of which has either three, five, or seven directly elected commissioners who are responsible for the county's fiscal operations and policy decisions (Maine County Commissioners Association, 2018). The counties range in size from the smallest in size, Sagadahoc County at 250 square miles, to the largest in size, Aroostook County at 6,453 square miles and in population from the smallest in population, Piscataquis County, population of 17,585, to the largest in population, Cumberland County, population of 281,674 (Maine County Commissioners Association, 2018). This diversity, as displayed by *Figure 4.1.* County Comparison of Maine Pre-Kindergarten to Twelfth Grade Student Population to Maine Third Grade Student Population, extends to the populations of students attending pre-Kindergarten through twelfth grade in each county and, similarly, to the populations of third grade students in each county.

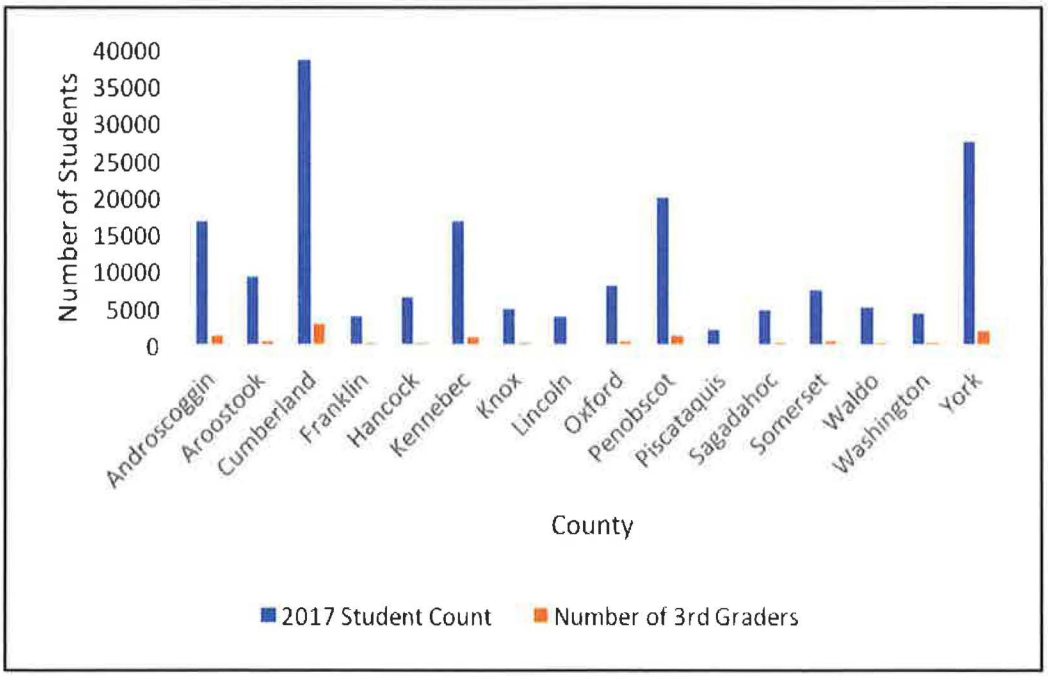

Figure 4.1. County Comparison of Maine Pre-Kindergarten to Twelfth Grade Student Population to Maine Third Grade Student Population

According to the Maine Department of Education (2018), Cumberland County, the county with the largest overall population, has the largest population of students in grades pre-Kindergarten to Twelve (38,545), and, as such, the largest population of students in third grade (2,909). York County, Penobscot County and Androscoggin County have the next largest populations of students in grades pre-Kindergarten to Twelve and students in third grade. Piscataquis County, the county with the smallest overall population, has the smallest population of students in grades pre-Kindergarten to Twelve (2,117), and the smallest population of students in third grade (171). Franklin County, Lincoln County, and Washington County have the next smallest populations of students in grades pre-Kindergarten to Twelve and students in third grade.

While the county-based frequency of SAUs that responded varied in comparison to the frequency of third grade student populations, the general trend linked higher SAU response rates to counties with higher student populations, with some exceptions, as displayed in *Figure 4.2*. State Percentages of Third Grade Students and Percentages of Overall Respondents Comparison. SAUs in Penobscot County, which has Maine's third highest population of third grade students, responded the most frequently, and consisted of 17.44% of total respondents. SAUs in Cumberland County, which has Maine's highest population of third grade students, and in Aroostook County, which has Maine's sixth highest population of third grade students, responded with the next highest frequency, as they each consisted of 11.63% of respondents. SAUs in Washington County, Maine's fourteenth highest population of third grade students, responded with the fourth highest frequency, and consisted of 9.30% of respondents. SAUs in Hancock,

Sagadahoc, Waldo, Franklin, and Piscataquis Counties had both low student populations and low response rates, which ranged from 0% of respondents to 3.49% of respondents.

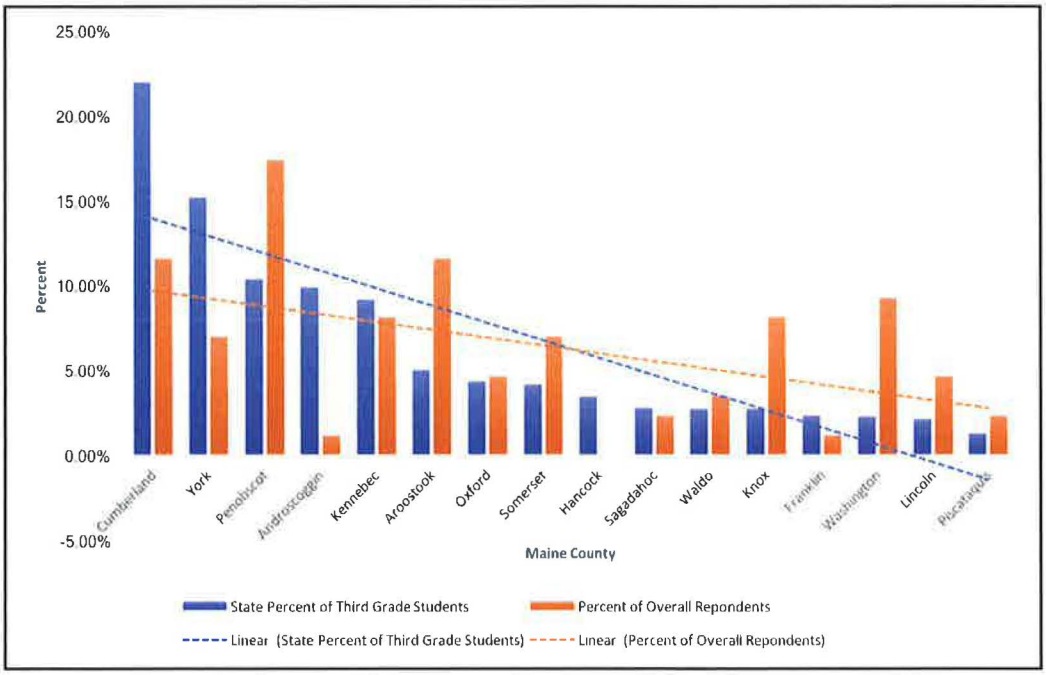

Figure 4.2. State Percentages of Third Grade Students and Percentages of Overall Respondents Comparison

Non-submitting respondents. A majority of those SAUs that responded to data solicitation for this study did not submit any of the requested cases for a variety of reasons as displayed in *Figure 4.3.* Reasons for Non-Participation as a Percentage of Overall "No" Respondents. Of this sub-sample, 57.63% of the SAUs did not use the NWEA and used another assessment tool such as Scantron or the Renaissance Learning STAR assessment to assess student achievement, or did not use any standardized formative progress monitoring tool, 13.56% of the SAUs did not have any students who fit the sample criteria, and 6.78% of SAUs had no student population at all. Additionally, 1.69% of SAUs overtly declined to contribute data, 1.69% of SAUs had a Superintendent

who did not permit their participation, and 18.64% of SAUs did not disclose a reason for non-participation.

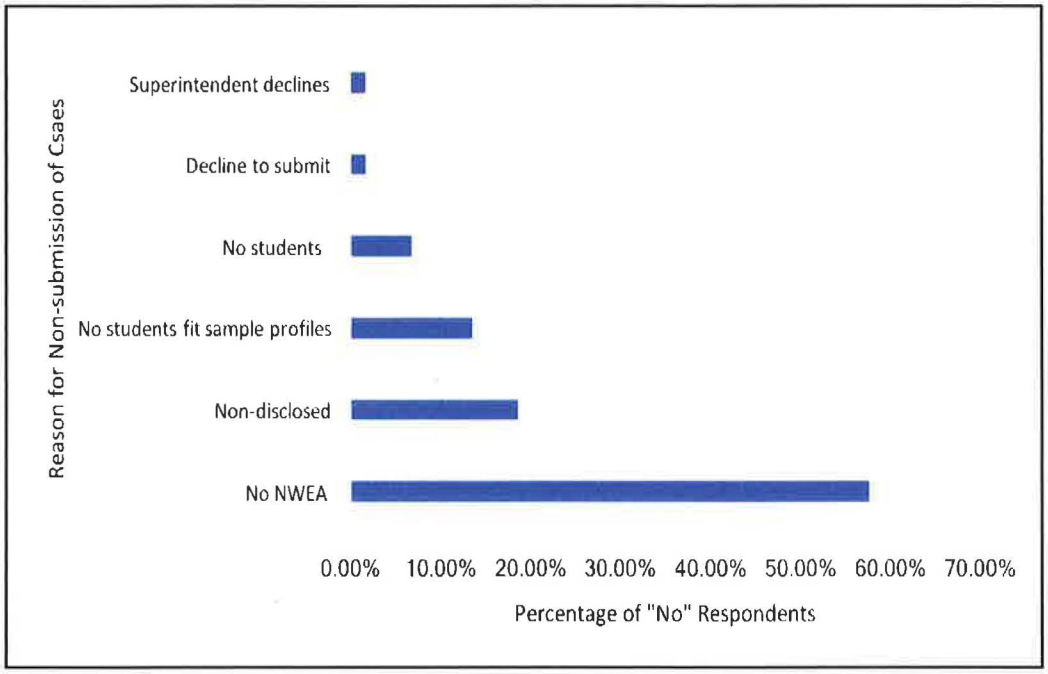

Figure 4.3. Reasons for Non-Participation as a Percentage of Overall "No" Respondents

The SAUs that did not submit cases because they did not use the NWEA and used another assessment tool, such as Scantron or the Renaissance Learning STAR assessment, or did not use any standardized formative progress monitoring tool were distributed across ten of the sixteen Maine counties. The SAUs that did not submit cases because they did not have any students who fit the sample criteria were distributed across three of the sixteen Maine counties. According to the Maine Department of Education (2018), the total student populations of these SAUs ranged from a low of four total students in grades pre-Kindergarten to grade Twelve to a high of 228 total students in grades pre-Kindergarten to grade Twelve. The SAUs that did not submit cases because they did not have any students all originated in one Maine county. The SAUs that declined to participate originated in one Maine county, as did the SAUs in which the

Superintendent did not permit participation in the study. The SAUs that did not disclose a reason for their non-participation were distributed across eight of the sixteen Maine counties.

The highest number of non-submitting respondent SAUs was in Penobscot County; 41.67% of those SAUs did not use the NWEA, 41.67% of those SAUs did not have students who fit sample criteria, 8.33% of those SAUs had a Superintendent who did not permit their participation in the study, and 8.33 % of those SAUs did not disclose a reason for non-submission. The next highest number of non-submitting respondent SAUs was in Aroostook County; 66.67% of those SAUs did not use the NWEA, 22.22 % of those SAUs did not have students who fit sample criteria, and 11.11% of those SAUs did not disclose a reason for non-submission. Notably, these counties have documented lower median incomes than many Maine counties, as well as lower populations of children under age 18 than many Maine counties. According to the U. S. Census Bureau (2018), Penobscot County has the state's seventh lowest median household income at $47,886 and an under-age 18 population of 18.6%, while Aroostook County has the state's second lowest median household income at $39,021 and an under-age 18 population of 18.7%.

Submitting respondents. Twenty-three respondents submitted a full or partial set of the requested cases. Reasons advanced for the partial samples included, but were not limited to, "We do not have a student who meets student 4 criteria," "We have no students who fit a couple of the profiles," and "We do assess 3rd grade students using NWEA however we are very small and only have 1 class per grade level. Of the 17-18 third grade students I have 2 with IEP's but only 1 that meets SLD criteria." Partial

samples were accepted as a means to increase the representativeness of the obtained data set. A total of 81 cases were submitted by special education administrators, but nine of these cases were discarded due to incorrect eligibility categories or otherwise incomplete IEPs. All other submitted cases were valid in terms of meeting the specifications of the data request. Additionally, despite assumptions of a certain prevalence of error in this regard, special education administrators properly de-identified all case materials submitted for this study. These efforts yielded a total sample of 72 cases *(n* = 72) from 23 Maine SAUs.

District administrative structure. The 188 Maine school administrative districts are arranged as Municipal School Units, Regional School Units, School Administrative Districts, Alternative Organizational Structures, Maine Indian Education, and Education in Unorganized Territories. According to the Maine Department of Education's most recently published data (2018), 40.24% are Municipal School Units, 46.95% are Regional School Units, 2.44% are School Administrative Districts, 6.71% are Alternative Organizational Structures, 1.83% are Maine Indian Education, and 1.83% are Education in Unorganized Territories. The obtained sample, as displayed by *Figure 4.4.* State and Sample Percentages of Maine School Administrative Structures, consisted of 28.57% Municipal School Units, 61.90% Regional School Units, 0 % School Administrative Districts, 9.52% Alternative Organizational Structures, 0 % Maine Indian Education, and 0% Education in Unorganized Territories.

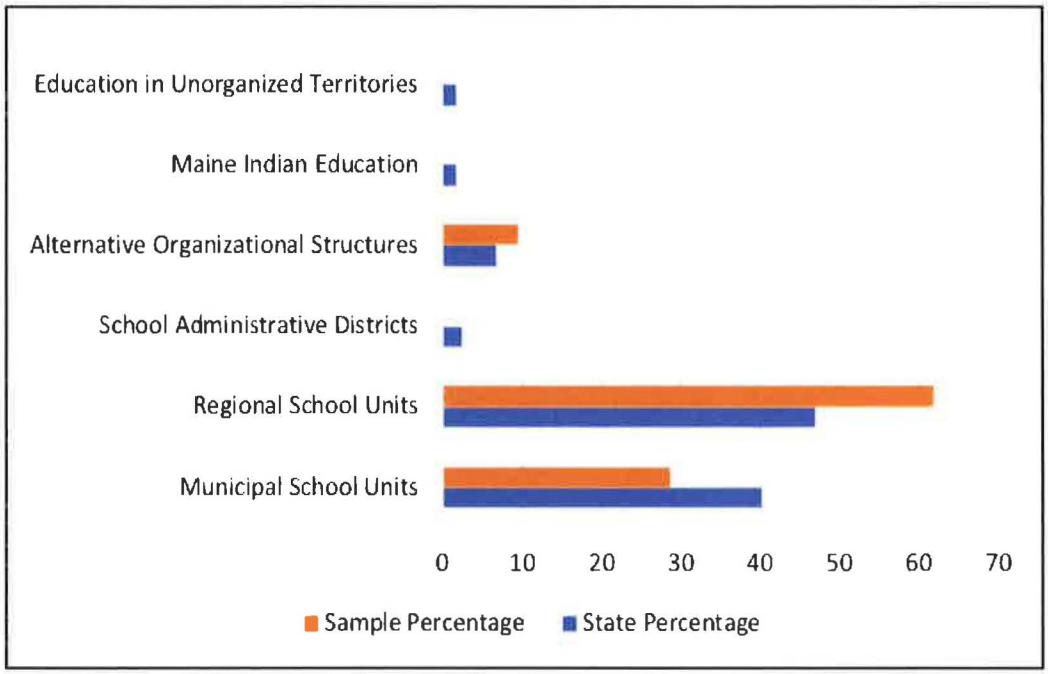

Figure 4.4. State and Sample Percentages of Maine School Administrative Structures

While the sample percentages are not equal to the state percentages, the obtained sample mirrors the frequency of the various administrative units as demonstrated at the state level.

District county distribution. The obtained sample consisted of cases from eleven of the sixteen counties. As displayed in *Figure 4.5.* Number of Submitting SAUs and Overall Percentage of Sample, the SAUs in Franklin County, Hancock County, Sagadahoc County, Waldo County, and Washington County did not submit any case materials for this study. Of those SAUs that submitted cases, most originated in Knox County: five, or 21.74% of the total. The fewest submitted cases originated from a variety of other counties including Androscoggin County, Aroostook County, Cumberland County, Piscataquis County, and Somerset County, respectively.

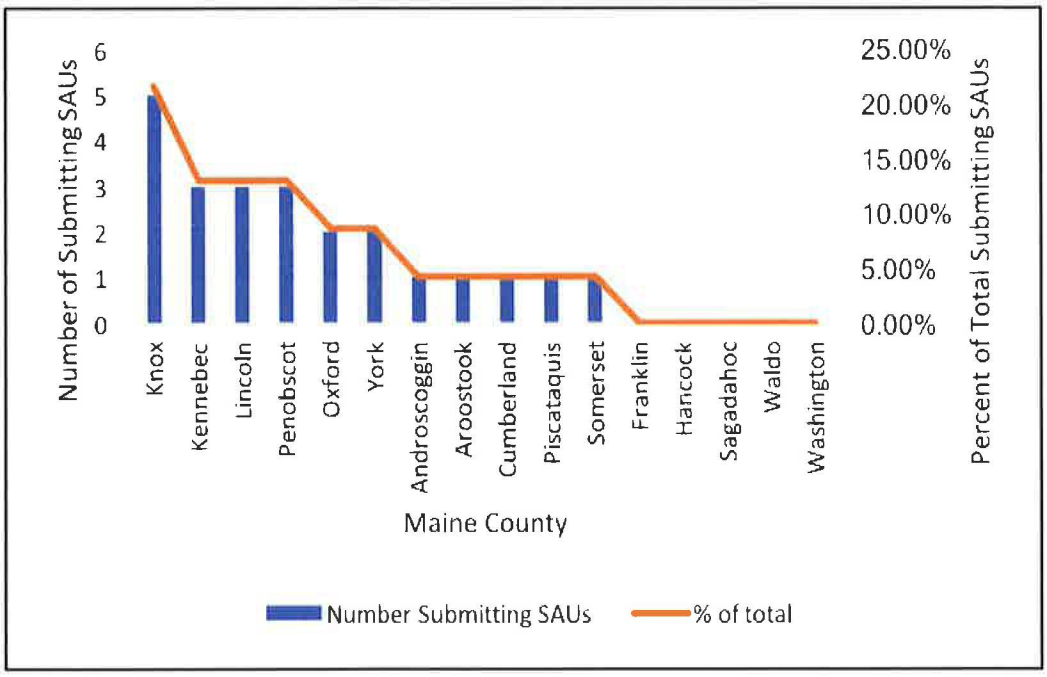

Figure 4.5. Number of Submitting SAUs and Overall Percentage of Sample

District third grade student counts. The county-based frequency of the sample cases differed from the county-based frequency of third grade students in Maine; the most cases, or 20.25% of the total cases originated from SAUs in Knox County, while the fewest cases, or 2.53% of the total cases, originated from SAUs in Somerset County. Zero percent of cases originated from SAUs in Franklin County, Hancock County, Sagadahoc County, Waldo County, or Washington County. As displayed in *Figure 4.6.* State and Sample Percentage of Maine Student Populations by County, 21.74% of the total submitted cases originated from SAUs in Knox County, only 2.74% of the Maine's third grade students attend SAUs in Knox County. Further, while 21.97% of Maine's third grade students attend SAUs in Cumberland County, only 5.06% of the total submitted cases originated from SAUs in Cumberland County. Notably, the percentage of Maine's third grade students attending SAUs in Aroostook County, 5.0%, and the percentage of the total submitted cases originating from SAUs in Aroostook County,

4.35%, were relatively similar.

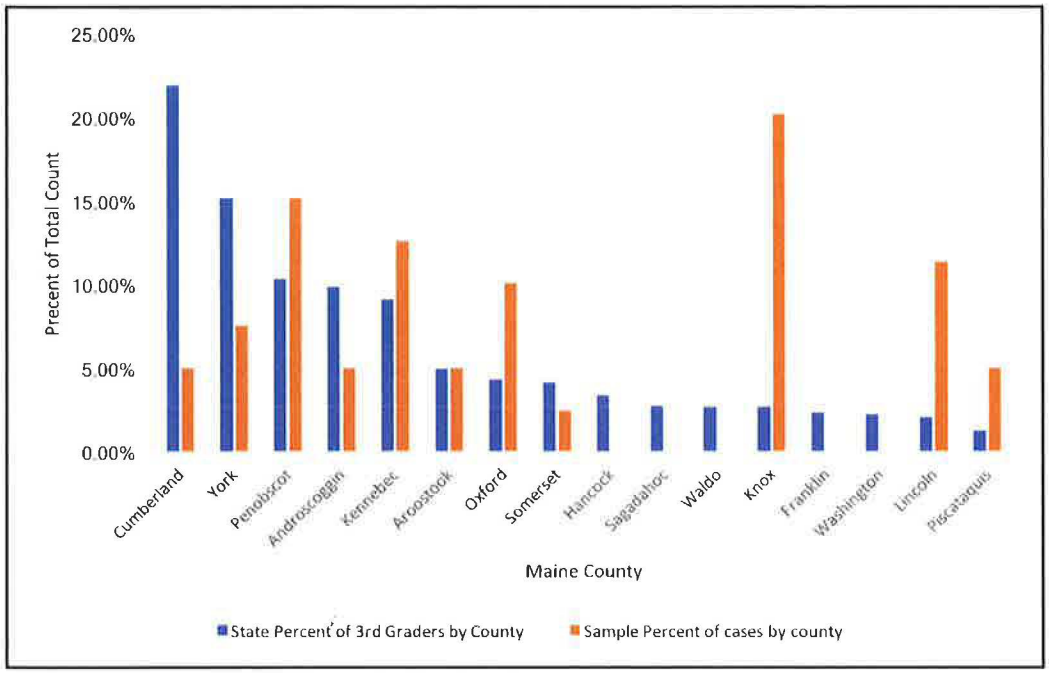

Figure 4.6. State and Sample Percentage of Maine Student Populations by County

The obtained sample of submitting SAUs does not mimic the frequency of the statewide frequency of third graders as a percent of each county's overall student population.

Disability frequency. These efforts were designed to obtain a data set that consisted of 50% of cases that were third graders eligible under the category of Specific Learning Disability and 50% of cases that were third graders eligible under the category of Other Health Impairment. However, due to the partial samples submitted by some SAUs, the sample consisted of 53.33% of cases that were third graders eligible under the category of Specific Learning Disability and 46.67% of cases that were third graders eligible under the category of Other Health Impairment. Partial sample sizes were primarily the result of school administrative units' lack of students who met the specific sample criteria in the data request.

Least Restrictive Environment

Maine schools are required by IDEA and Maine Unified Special Education Regulations to include the student's least restrictive environment (LRE) percentage on each IEP. To determine the LRE percentage for each case, Section 9: Least Restrictive Environment on each corresponding submitted IEP was reviewed. The obtained LRE percentages ranged from a minimum value of 15% to a maximum value of 100%, with a mean value of 80.167 and a standard error of the man of 1.82059 and a standard deviation of 15.44823. The skew statistic of the data set is -1.590, with a standard of .283, which indicates the data is highly skewed and is negatively skewed to the left, possibly due to the presence of two outliers (values of 15 and 36). The kurtosis statistic of the data set is 3.847, with a standard error of .559 and an excess of .847, indicating that the shape of the distribution is leptokurtic. The Kolmogorov-Smirnov test of normality has a *p*-value less than .05 ($p = .004$), which indicates the LRE data are not normally distributed.

Overall, the cases were skewed towards those with higher least restrictive environment percentages. This indicates that students whose IEPs were submitted for this study received most of their educational programming in the general education setting. Forty-five cases, or 62.5% of the entire sample, had least restrictive environment percentages that fell within the special education category - *outside the regular classroom less than 21 percent of the school day.* Twenty-five cases, or 34.72% of the entire sample, had least restrictive environment percentages that fell within the special education category - *inside the regular class no more than 79 percent of the day and no less than 40 percent of the day.* Two cases, or 2.78% of the entire sample, had least restrictive environment percentages that fell within the special education category - *inside the regular class for less than 40 percent of the school day.*

Standards-Based IEP Compliance Review

Research Question Addressed

- Are there evident patterns in compliance of subcomponents of standards-based IEPs as measured by Maine's General Supervision System Monitoring Tool?

In accordance with the most recent iteration of its Policy on Standards-Based IEP Goals (2015), Maine has established specific expectations for IEP compliance, which are subsequently reflected on the Maine GSS Monitoring Tool (2016). The Maine Department of Education generally uses this Tool to determine the percentage compliance for each SAU being monitored and define corrective action activities SAUs must complete when a finding of non-compliance is made (2015).

To rate the compliance level of each IEP received for this study, the components of the GSS Monitoring Tool pertinent to adherence to the standards-based IEP expectations established in the 2015 Policy were utilized. Specifically, the primary sections of the Maine State IEP form reviewed and rated were Section 6A: Academic strengths of the child, Section 6A: Academic needs of the child, Section 6A: A statement of the child's present levels of academic achievement, and Section 6A: Measurable annual goals. Section 6A: Measurable annual goals is further divided into four components that include goal alignment, goal formatting, goal measurability, and goal citation and standard linkage. The GSS Monitoring Tool (2016) groups the first three components into an "Academic" section and the latter components into a "Standards-Based Goals" section for rating purposes. Components were co-scored on a binary rating scale of yes (1) or no (2).

To determine each IEP's compliance rating, the results of the subset of the GSS Monitoring Tool were input into the Standards-Based IEP Compliance Stage Rubric. Possible overall scores on this Rubric included: 1: Emerging Stage (0-24 percent compliant), 2: Progressing Stage (25-50 percent compliant), 3: Partial Mastery Stage (51-75 percent compliant), and 4: Mastery Stage (76-100 percent compliant). The ratings for this study, which were obtained after the establishment of an acceptable level of inter-rater reliability of 93.33%. The ratings ranged from a minimum value of 1: Emerging Stage to a maximum value of 4: Mastery Stage, with a mean value of 2.6181 and a standard error of the mean of .10206 and a standard deviation of .86600. The skew statistic of the data set is an acceptable -.276, with a standard error of .283, which indicates there are more small values in the data. The kurtosis statistic of the data set is an acceptable -.762 with a standard error of .559, indicating that, while the shape of the distribution may be more flat than normal, the value is still relatively close to zero. Given the acceptable levels of skew and kurtosis, as well as the fact that the Kolmogorov-Smirnov test of normality has a p-value greater than .05 ($p = .143$), it is evident that these data are normally distributed.

Academic section.

APG2, Section 6A: Academic strengths of the child. This component of the GSS Monitoring Tool was designed to assess the IEP's statement of academic strengths of the child, in terms of its action as the pathway to the general education curriculum in performance, achievement, or both, relative to age, State approved grade level standards or intellectual development (Maine Department of Education, 2016). Of the total sample

of 72 IEPs (n = 72), 68.06% of IEPs did not meet expectations in this area, and 31.94% of IEPs did meet expectations in this area.

APG3, Section 6A: Academic needs of the child. This component of the GSS Monitoring Tool was designed to assess the presence and completeness of IEP's statement of academic needs of the child, particularly in terms of its ability to address how the student is doing in the content area curriculum (Maine Department of Education, 2016). Of the total sample of 72 IEPs (n = 72), 54.17% of IEPs did not meet expectations in this area, and 45.83% of IEPs did meet expectations in this area.

APG4, Section 6A: A statement of the child's present levels of academic achievement. This component of the GSS Monitoring Tool was designed to assess the presence and completeness of IEP's statement of the child's present levels of performance and how the child's disability affects the child's involvement and progress in the general education curriculum (Maine Department of Education, 2016). Of the total sample of 72 IEPs (n = 72), 38.89% of IEPs did not meet expectations in this area, and 61.11% of IEPs did meet expectations in this area.

Standards-based IEP goal section.

SBG1, Section 6A: Academic IEP goal alignment. This component of the GSS Monitoring Tool was designed to assess the alignment of the student's academic goals with the student's needs and present levels of academic performance, and to assess how such goals may facilitate the student's achievement of grade level Maine Learning Results (Maine Department of Education, 2016). Of the total sample of 72 IEPs (n = 72), eight IEPs were not rated in this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained

academic goals, 51.56% of IEPs did not meet expectations in this area, and 48.44 % of IEPs did meet expectations in this area.

SBG2, Section 6A: Academic IEP goal formatting. This component of the GSS Monitoring Tool was designed to assess the structure of standards-based IEP goals, and ensure their formatting met State expectations: (what date), given (conditions), student will (do what observable behavior), as measured by (assessment or other) (Maine Department of Education, 2016). Of the total sample of 72 IEPs ($n = 72$), eight IEPs were not rated by this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 12.5% of IEPs did not meet expectations in this area, and 87.5% of IEPs did meet expectations in this area.

SBG3, Section 6A: Academic IEP goal measurability. This component of the GSS Monitoring Tool was designed to assess the measurability of the standards-based IEP goals in terms of their inclusion of data or activities to be measured by score, percent, frequency, or a specific demonstration of mastery (Maine Department of Education, 2016). Of the total sample of 72 IEPs ($n = 72$), eight IEPs were not rated by this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 14.06% of IEPs did not meet expectations in this area, and 85.94% of IEPs did meet expectations in this area.

SBG4, Section 6A: Academic goal citation and standard linkage. This component of the GSS Monitoring Tool was designed to assess whether or not the standards-based IEP goals have citations linking them to grade level (or grade span) general education curriculum standards (Maine Department of Education, 2016). Of the

total sample of 72 IEPs ($n = 72$), eight IEPs were not rated by this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 14.06% of IEPs did not meet expectations in this area, and 85.94% of IEPs did meet expectations in this area.

As displayed in *Figure 4.7.* IEPs Meeting Expectations by Subcomponent Ratings on the GSS Monitoring Tool, a majority of submitted IEPs met compliance expectations in this section of the IEP, as most IEPs met expectations in at least three of the four subcategories. Notably, this section addresses one part higher level content (SBG1) and three parts formatting of the standards-based IEP goals (SBG2, SBG3, SBG4). While the percentages of IEPs meeting expectations in SBG1, Section 6A: Academic IEP goal alignment were similar to the percentages of IEPs meeting expectations in the Academic Section, the percentages of IEPs meeting expectations in SBG2, SBG3, and SBG4, 87.5%, 85.94%, and 85.94% respectively, was significantly different.

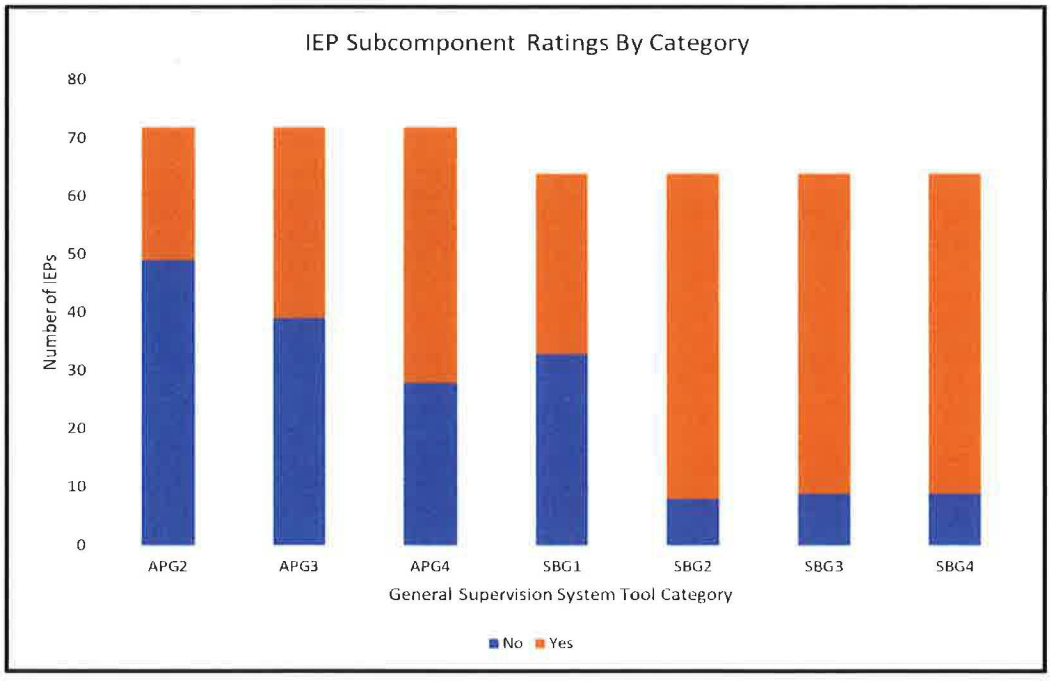

Figure 4.7 IEPs Meeting Expectations by Subcomponent Ratings on the GSS Monitoring

Tool

The overall section scores on the academic component and standards-based goal components of the subset of the GSS Monitoring Tool are notable, as reflected on the Standards-Based IEP Rubric. The maximum possible score in the Academic Section was a three, and the maximum possible score in the Standards-Based Goal Section was a four. All IEPs were scored in the Academic Section - 23.61% of IEPs scored a zero, 30.56% of IEPs scored a one, 29.17% of IEPs scored a two, and 16.67% of IEPs scored a three as an overall Academic section score. A score of four was not possible in this section. The ratings for the Academic section ranged from a minimum value of zero to a maximum value of three, with a mean rating of 1.3889 and a standard error of the mean of .12122 and a standard deviation of 1.02854. The skew statistic of the data set is an acceptable .108, with a standard error of .283, which indicates the data is symmetrical, with a slight skew to the right. The kurtosis statistic of the data set is -1.110, with a standard error of .559, which indicates that the shape of the distribution may be more flat than normal. The Kolmogorov-Smirnov test of normality has a p-value greater than .05 ($p = .189$), indicates the data are normally distributed.

Of the sample of 72 IEPs, 64, or 90.28%, were scored in this section; while the academic section is required for all IEPs, some students did not have academic goals due to the functional nature of their disability - 0% of IEPs scored a zero, 1.56% of IEPs scored a one, 21.88% of IEPs scored a two, 42.19% of IEPs scored a three, and 34.36% of IEPs scored a four as an overall Standard-Based Goal section score. A score of zero was possible in this section, but did not occur. The ratings for the Standards-Based Goal section ranged from a minimum value of zero to a maximum value of four, with a mean rating of 3.0462 and a standard error of the mean of .10838 and a standard deviation of

.87376. The skew statistic of the data set is an acceptable -.816, with a standard error of .297, which indicates there are more small values in the data. The kurtosis statistic of the data set is an acceptable .935, with a standard error of .586, indicating that, while the shape of the distribution may be more peaked than normal, the value is still relatively close to zero. Given the acceptable levels of skew and kurtosis, as well as the fact that the Kolmogorov-Smirnov test of normality has a *p*-value greater than .05 ($p = .233$), it is evident that these data are normally distributed.

As displayed in *Figure 4.8.* Overall Section Scores on the Subset of the General Supervision System Monitoring Tool, 34.36% of IEPs earned the top score in the Standards-Based IEP Goal section and 16.67% of IEPs earned the top score in the Academic Goal section, while 0% of IEPs earned the lowest score in the Standards-Based IEP Goal section and 23.61% of IEPs earned the lowest score in the Academic section. Scores in the Standards-Based IEP Goal section were skewed towards the higher scores, while scores in the Academic section were more evenly distributed but still skewed towards the lower scores.

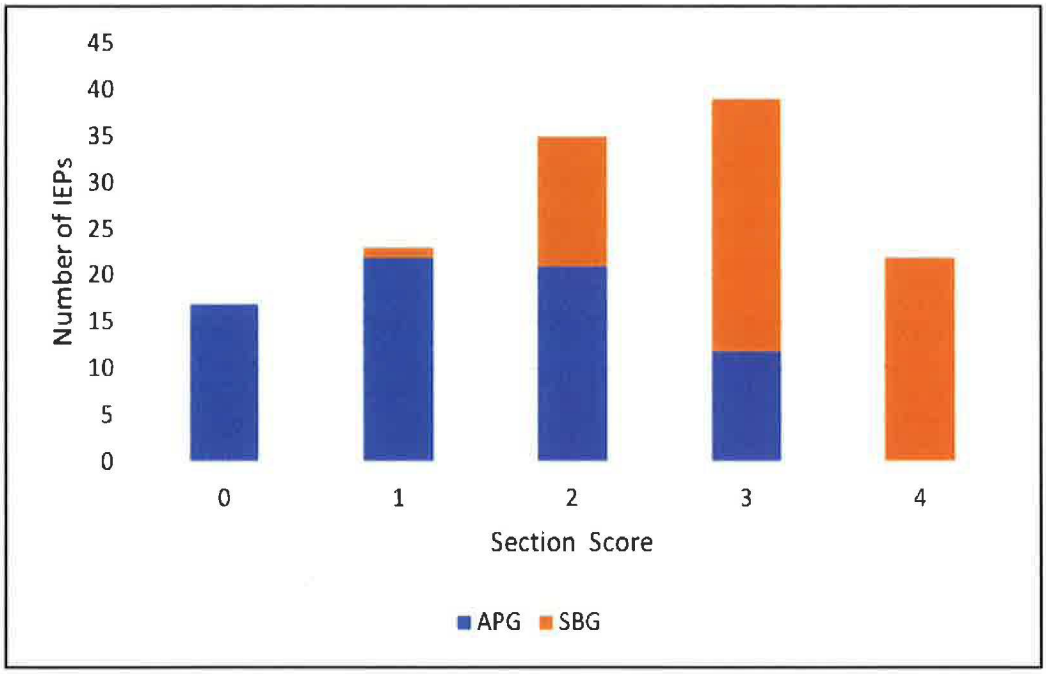

Figure 4.8. Overall Section Scores on the Subset of the General Supervision System Monitoring Tool

Northwest Evaluation Association Percentage Growth Target Calculations

Northwest Evaluation Association (NWEA) math and reading growth target attainment percentages were selected as a reliable measure of student achievement for this study, as this assessment allows educators to "measure the growth of every student over time regardless of grade level performance – and even if standards change" (Northwest Evaluation Association, 2017). The use of the NWEA to formatively assess student progress is a common practice in many, though not all, of Maine's SAUs. This study's use of NWEA growth target percentages in math and reading, respectively, is appropriate.

According to the most recently published NWEA Norms Study (2015), which reflects the Common Core State Standards, NWEA calculates student growth targets using a starting score to predict growth. For a student in third grade, NWEA's mean

projected growth norm in reading from Fall to Spring is approximately 10 points (Northwest Evaluation Association, 2015). For a student in third grade, NWEA's mean projected growth norm in math from Fall to Spring is approximately 13 points (Northwest Evaluation Association, 2015). However, growth projections do vary between students as students starting out at a lower performance level tend to grow more (Northwest Evaluation Association, 2015).

In this study, NWEA RIT score growth projections were obtained directly from student NWEA MAP Growth Progress Reports from the 2017-2018 school year. Those scores, as displayed in *Figure 4.9*. Projected Student Growth in Math NWEA RIT Score, ranged from a minimum of 11 points to a maximum of 18 points. The mean value of the growth projections was 13.56 points and the median value was 13 points. The overall distribution of these data points was normal, but skewed to the right, with acceptable levels of skewness and kurtosis, with a high frequency of growth projections between 13 and 14 points.

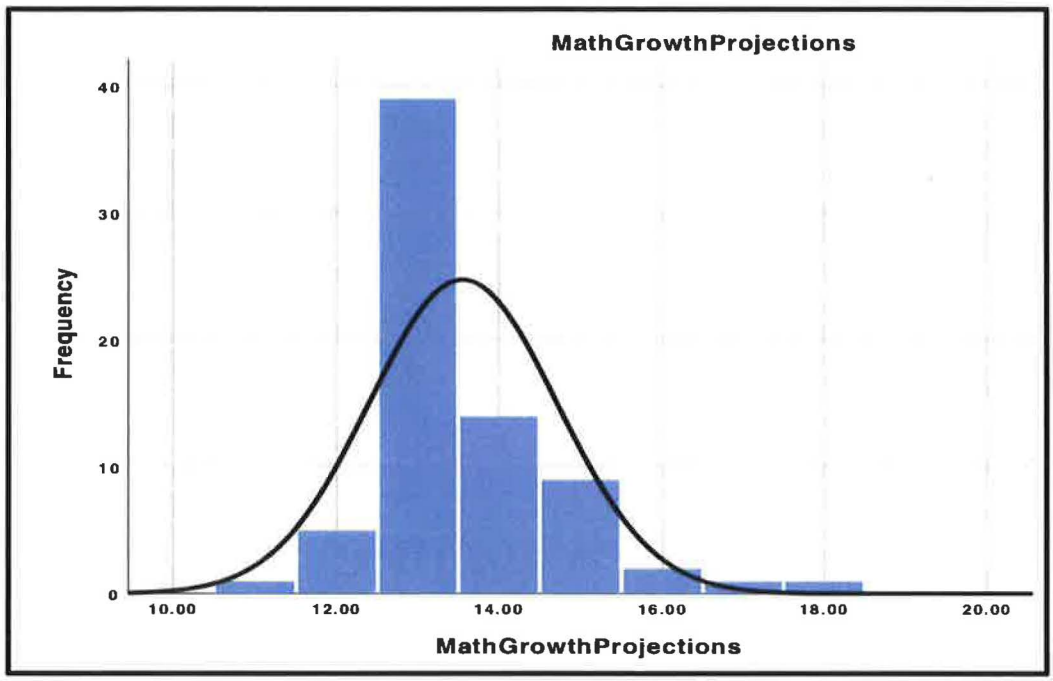

Figure 4.9. Projected Student Growth in Math NWEA RIT Score

Actual student growth in NWEA RIT score, as displayed in *Figure 4.10.* Actual Student Growth in Math NWEA RIT Score, ranged from a minimum of -12 points to a maximum of 32 points. The mean value of the actual student growth was 11.53 points and the median value 11 points, both less than the projected student growth in NWEA RIT score. The overall distribution of these data points was normal, with acceptable levels of skewness and kurtosis, with a high frequency of data points between 5 and 15 points.

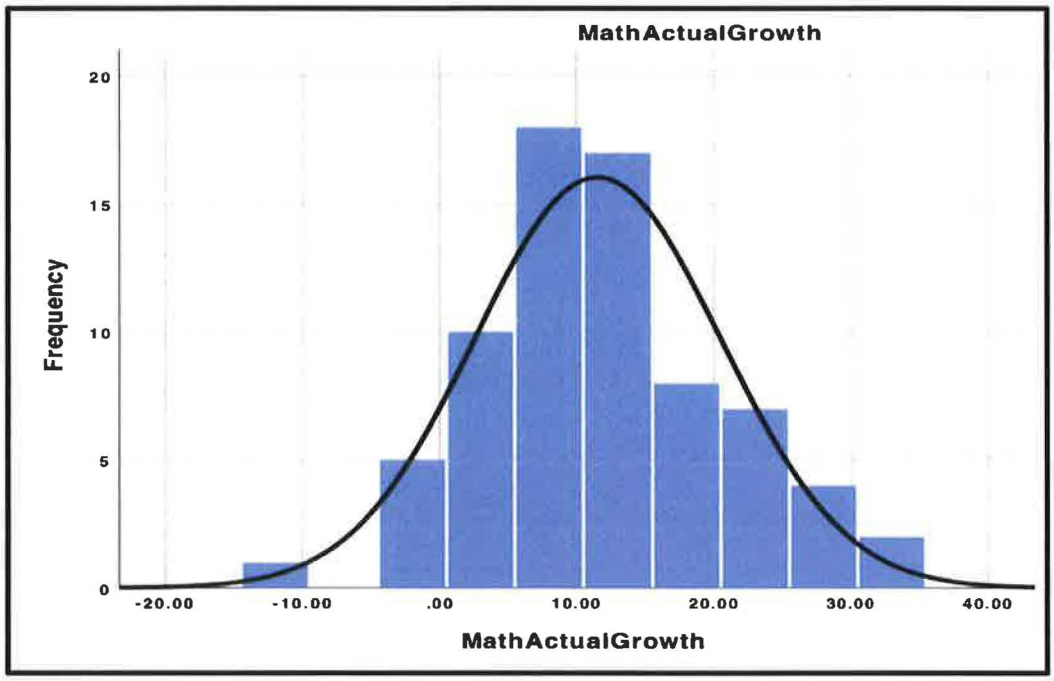

Figure 4.10. Actual Student Growth in Math NWEA RIT Score

In this study, NWEA RIT score growth projections were obtained directly from student NWEA MAP Growth Progress Reports from the 2017-2018 school year. These scores ranged from a minimum of 9 points to a maximum of 18 points as displayed in *Figure 4.11.* Projected Student Growth in Reading NWEA RIT Score. Upon removal of the outlier associated with Case TTT, the mean value of the growth projections was 13.03 points and the median value was 13 points. The overall distribution of these data points was normal, with acceptable levels of skewness and a kurtosis value of -1.145, indicating the distribution was broader and flatter than normal, with the highest point frequencies between 10 and 15 points.

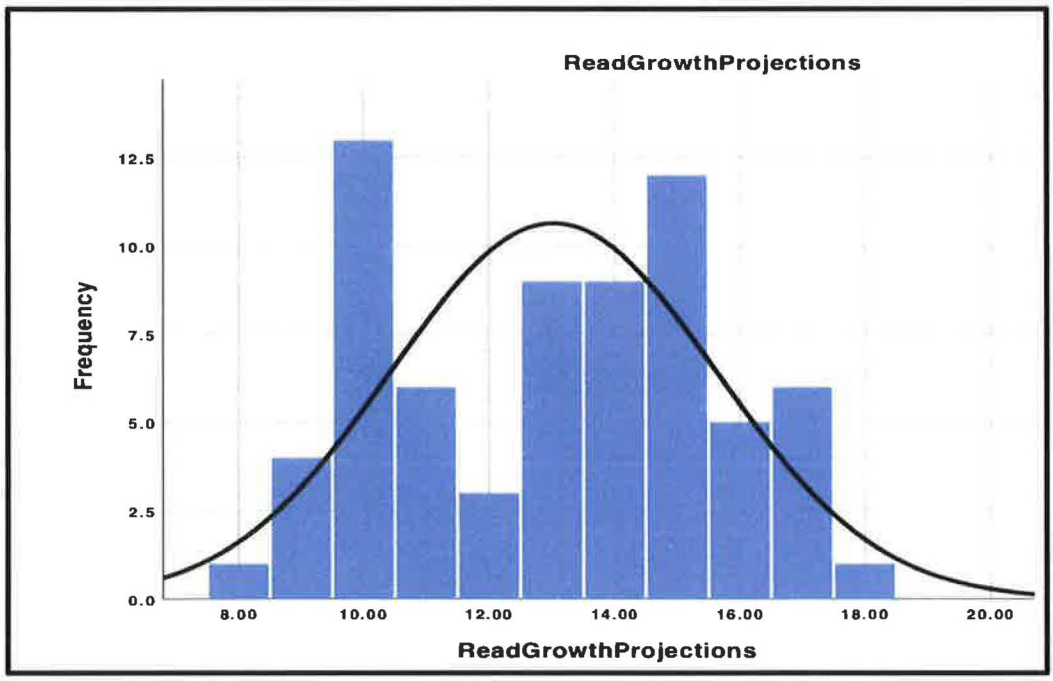

Figure 4.11. Projected Student Growth in Reading NWEA RIT Score

Actual student growth in reading NWEA RIT score ranged from a minimum of -17 points to a maximum of 45 points as displayed in *Figure 4.12*. Actual Student Growth in Reading NWEA RIT Score. Upon removal of the outlier associated with Case TTT, the mean value of actual student growth was 10.99 and the median value was 11. The overall distribution of these data had acceptable levels of skewness and a kurtosis value of 1.111, indicating the distribution was more peaked than normal, with a higher concentration of positive values than the actual growth scores on the math NWEA.

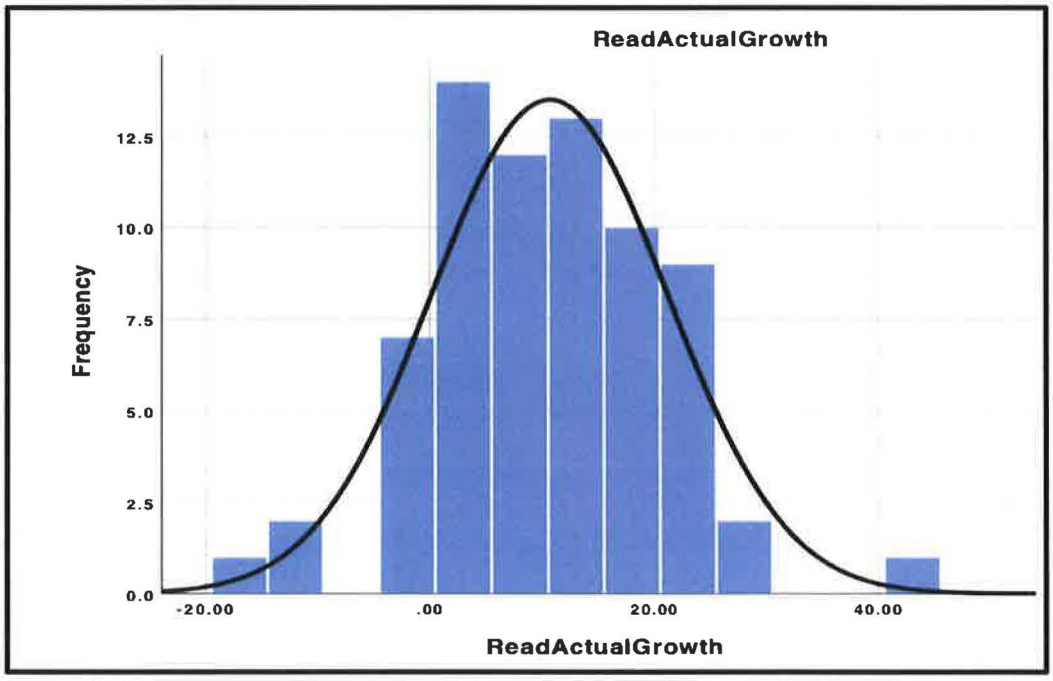

Figure 4.12. Actual Student Growth in Reading NWEA RIT Score

The percentage of student growth target attainment in both math and reading, respectively, was obtained by first identifying the actual amount of student growth in RIT score on the math NWEA from the Fall term to the Spring term. Then, this value was to the student's projected growth in RIT score through a percentage calculation.

Math growth target percentages. The percentage of student growth target attainment in math varied from a minimum value of -92.31% of projected growth target attainment to a maximum value of 263.64% of projected growth target attainment. Outliers included Case II, with a percent growth target attainment value of 263.64%, and Case WW, with a percent growth target attainment value of -92.31%. The mean value of the data set was 84.4814%, with a standard error of the mean of 7.72054 and a standard deviation of 65.51095. The skew statistic of the data set was an acceptable .188, with a standard error of .283, which indicates there were more small values in the data. The kurtosis statistic of the data set was an acceptable .254, with a standard error of .559,

indicating that, while the shape of the distribution was more peaked than normal, the value was still relatively close to zero. Given the acceptable levels of skew and kurtosis, as well as the fact that the Kolmogorov-Smirnov test of normality had a *p*-value greater than .05 ($p = .060$), it is evident that these data were normally distributed.

Reading growth target percentages. The percentage of student growth target attainment in reading varied from a minimum value of -92.31% of projected growth target attainment to a maximum value of 263.64% of projected growth target attainment. There were three missing cases (due to failure of submitting districts to provide reading NWEA scores associated with the case). Outliers included Case II, with a percent growth target attainment value of -170 percent and Case OOO, with a percent growth target attainment value of -125%. The mean value of the data set was 79.2859%, with a standard error of the mean of 9.23241 and a standard deviation of 76.69016. The skew statistic of the data set was an acceptable -.662, with a standard error of .289, which indicates there were more large values in the data. The kurtosis statistic of the data set was an acceptable 1.278 with a standard error of .570, indicating that, while the shape of the distribution was more peaked than normal, the value was still relatively close to zero. Given the acceptable levels of skew and kurtosis, as well as the fact that the Kolmogorov-Smirnov test of normality has a *p*-value greater than .05 ($p = .065$), it is evident that these data were normally distributed.

Impact of Standards-Based IEP Compliance on Student Math Achievement

Research Question Addressed

- Is there a statistically significant difference between the math achievement of third grade students with disabilities with Maine state compliant standards-based

IEPs and of students with disabilities without fully state compliant standards-based IEPs?

A one-way ANCOVA was conducted using SPSS software to determine if there was a statistically significant impact of the independent variable of the overall IEP compliance rating, a summative score calculated using the Rubric created for this study, on the dependent variable of percent growth target attainment on the math NWEA, while controlling for disability and least restrictive environment percentage (IBM Corp. SPSS Statistics Premium Gradpack for Mac, Version 25, 2014). Levene's test (p =.009) and normality checks were conducted. The correlation between Disability and LRE was low (r = .148). As depicted in Table 4.2. *ANCOVA Between-Subjects Effects – Math, there* was no significant difference in percent growth target attainment on the math NWEA [$F(6, 63) = .519$, p =.792] between the IEP Ratings, while adjusting for disability and LRE. The partial Eta Squared value of .047 indicates, when compared with Cohen's guidelines, that for IEP Compliance Rating, the effect size was small, thus indicating the strength of the relationship between these two variables was weak and only 4.7% of the variance in the percent growth target attainment on the math NWEA was explained by the IEP compliance rating.

Table 4.2

ANCOVA Between-Subjects Effects - Math

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Math	Disability	.018	.893	.000
	LRE	2.939	.091	.045
	IEP Rating	.519	.792	.047

Result: For mathematics, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in math as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine state compliance standards is accepted at the $p < .05$ level. The data suggests that student math achievement is not affected by IEP compliance rating after controlling for student disability and student least restrictive environment.

To further explore the impact of any evident interaction effect on these results, SPSS was used to conduct a Test of Assumption of the Homogeneity of Regression Slopes (IBM Corp. SPSS Statistics Premium Gradpack for Mac, Version 25, 2014). The interactions between IEP rating and disability ($p = .999$), IEP Rating and LRE ($p = .976$), and IEP rating, LRE, and disability ($p = .996$) were all nonsignificant, although the interaction between IEP rating and disability neared significance at the $p < .05$ level. This verifies the assumption of the homogeneity of regression of all slopes and further verifies that the relationship between the covariates and outcomes was the same in all groups.

When comparing the estimated marginal means using the Bonferroni confidence interval adjustment, as displayed in Table 4.3 *Estimated Marginal Means - Math*, it is evident that students with an IEP compliance rating of one (mean = 111.623) and IEPs with an IEP compliance rating of four (mean = 96.133), attained the highest percentages of growth target attainment on the NWEA, when the effects of disability and least restrictive environment are removed. Students with an IEP compliance rating of 1.5 (mean = 50.624) attained the lowest percentage of growth target attainment on the NWEA. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state expectations demonstrated lower achievement than those students whose IEPs were not at all compliant with Maine state expectations.

Table 4.3

Estimated Marginal Means - Math

IEP Rating	Mean	Std. Error
1.00	111.623	27.592
1.50	50.624	33.522
2.00	90.059	17.601
2.50	87.084	18.334
3.00	70.121	17.959
3.50	81.957	18.026
4.00	96.133	29.409

Impact of Standards-Based IEP Compliance on Student Reading Achievement

Research Question Addressed

- Is there a statistically significant difference between the reading achievement of third grade students with disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

A one-way Analysis of Covariance (ANCOVA) was conducted using SPSS software to determine if there was a statistically significant impact of the independent variable of overall IEP compliance rating on the dependent variable of percent growth target attainment on the reading NWEA, while controlling for disability and least restrictive environment percentage (IBM Corp. SPSS Statistics Premium Gradpack for Mac, Version 25, 2014). Levene's test (p =.364) and normality checks were conducted, equal variances were assumed, and assumptions were met. The correlation between disability and LRE was low (r = .148). As depicted in Table 4.4. *ANCOVA Between-Subjects Effects –Reading*, there was a significant difference in percent growth target attainment on the reading NWEA [F (6, 60) = 2.340, p = .043] between the IEP ratings, while adjusting for disability and LRE. The partial Eta Squared value of .190 was small, indicating the interaction between the variables, when compared with Cohen's guidelines, was weak.

Table 4.4

ANCOVA Between-Subjects Effects - Reading

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Reading	Disability	1.418	.238	.023
	LRE	.142	.708	.002
	IEP Rating	2.340	.043	.190

Result: For reading, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards is rejected at the $p < .05$ level. The data suggests that student reading achievement was affected by IEP Compliance Rating after controlling for student disability and student least restrictive environment.

To further explore the impact of the interaction effect on these results, SPSS was used to conduct a Test of Assumption of the Homogeneity of Regression Slopes (IBM Corp. SPSS Statistics Premium Gradpack for Mac, Version 25, 2014). The interactions between IEP rating and disability ($p = .054$), IEP rating and LRE ($p = .231$), and IEP rating, LRE, and disability ($p = .105$) were all nonsignificant, although the interaction between IEP rating and disability neared significance at the $p < .05$ level. This verified the assumption of the homogeneity of regression of all slopes and, further, that the relationship between the covariates and outcomes was the same in all groups.

When comparing the estimated marginal means with a Bonferroni confidence interval adjustment, as displayed in Table 4.5 *Estimated Marginal Means – Reading,* it was evident that students with an IEP compliance rating of two (mean = 121.320) and IEPs with an IEP compliance rating of 3.5 (mean = 116.648), attained the highest percentages of growth target attainment on the NWEA, when controlling for the effects of disability and least restrictive environment. Students with an IEP compliance rating of 1.5 (mean = 21.066) attained the lowest percentage of growth target attainment on the NWEA. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state expectations demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations.

Table 4.5

Estimated Marginal Means - Reading

IEP Rating	Mean	Std. Error
1.00	31.064	30.840
1.50	21.066	37.278
2.00	121.230	20.306
2.50	60.159	21.106
3.00	71.466	20.885
3.50	116.648	19.960
4.00	51.303	32.621

Impact of Standards-Based IEP Academic Section Compliance on Reading Achievement

As displayed in Table 4.6 *ANCOVA Between-Subjects Effects – Reading (IEP Academic Section,* a one way ANCOVA was conducted using SPSS software to determine if there was a statistically significant difference between the independent variable of each standards-based IEP's Academic Section compliance rating on the dependent variable of percent growth target attainment on the reading NWEA, while controlling for disability and least restrictive environment percentage. Levene's test (p = .637) and normality checks were carried out, equal variances were assumed, and the assumptions were met.

There was no significant difference in percent of growth target attainment on the reading NWEA [F (3, 63) =.333, p = .801] between the Standards-Based IEP Academic Section Ratings, while adjusting for Disability and LRE. The partial Eta Squared value of .016 indicates, when compared with Cohen's guidelines, that for Standards-Based IEP Academic section compliance rating the effect size is very small, thus indicating the strength of the relationship between these two variables is weak and only 1.6% of the variance in the percent growth target attainment on the reading NWEA is explained by the Standards-Based IEP Academic Section compliance rating.

Table 4.6

ANCOVA Between-Subjects Effects – Reading (IEP Academic Section)

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Reading	Disability	.557	.458	.009
	LRE	.095	.759	.002
	IEP Academic Section Rating	.333	.801	.016

Result: For reading, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards in the Academic Section is maintained at the $p < .05$ level. The data suggests that student reading achievement was not affected by Standards-Based IEP Academic Section Compliance Rating after controlling for student disability and student least restrictive environment.

When comparing the estimated marginal means with a Bonferroni confidence interval adjustment, as displayed in Table 4.7 *Estimated Marginal Means: Reading (IEP Academic Section),* it is evident students with a Standards-Based IEP Academic Section compliance rating of three (mean = 86.229) and a Standards-Based IEP Academic Section compliance rating of two (mean = 83.661), attained the second highest percentages of growth target attainment on the NWEA, when controlling for disability and least restrictive environment. Students with a Standards-Based IEP Academic Section compliance rating of one (mean = 65.050) attained the lowest percentage of growth target attainment on the NWEA. Students with a Standards-Based IEP Academic Section compliance rating of zero (mean = 87.081) attained the highest percentages of growth target attainment on the NWEA, when controlling for disability and least restrictive environment percentage. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state expectations in the academic section demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations. However,

students whose IEPs received ratings of zero on this section demonstrated, on average, higher achievement than all other students.

Table 4.7

Estimated Marginal Means: Reading (IEP Academic Section)

IEP Rating	Mean	Std. Error
0.00	87.081	19.604
1.00	65.050	17.254
2.00	83.661	18.584
3.00	86.229	23.109

Impact of Standards-Based IEP Standards-Based Goal Section Compliance on Reading Achievement

A one way Analysis of Covariance (ANCOVA) was conducted using SPSS software to determine if there was a statistically significant difference between the independent variable of each standards-based IEP's Standards-Based Goal Section compliance rating on the dependent variable of percent growth target attainment on the reading NWEA, while controlling for disability and least restrictive environment percentage. Levene's test (p = .142) and normality checks were carried out, equal variances were assumed, and the assumptions were met.

As displayed in Table 4.8. *ANCOVA Between-Subjects Effects – Reading (IEP SBG Section), there was no* significant difference in percent growth target attainment on the reading NWEA [F (4, 62) =.282, p = .889] between the Standards-Based IEP

Standards-Based Goal Section compliance ratings, while adjusting for disability and LRE. The partial Eta Squared value of .020 indicates, when compared with Cohen's guidelines, that for Standards-Based IEP Standards-Based Goal Section compliance rating the effect size is very small, thus indicating the strength of the relationship between these two variables is weak and only 2.0% of the variance in the percent growth target attainment on the reading NWEA is explained by the Standards-Based IEP Standards-Based Goal Section compliance rating.

Table 4.8

ANCOVA Between-Subjects Effects – Reading (IEP SBG Section)

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Reading	Disability	.708	.404	.013
	LRE	.306	.583	.006
	IEP Standards-Based Goal Section Rating	.282	.889	.020

Result: For reading, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards in the Standards-Based IEP Standards-Based Goal Section is maintained at the $p < .05$ level. The data suggests that student reading achievement was not affected by Standards-Based IEP Standards-Based Goal Section compliance rating after controlling for student disability and student least restrictive environment.

When comparing the estimated marginal means with a Bonferroni confidence interval adjustment, as displayed in Table 4.9 *Estimated Marginal Means: Reading (IEP SBG Section),* it is evident students with a Standards-Based IEP Standards-Based Goal Section compliance rating of three (mean = 84.402) and a Standards-Based IEP Standards-Based Goal Section compliance rating of four (mean = 84.176), attained the highest percentages of growth target attainment on the NWEA, when the effects of disability and least restrictive environment are removed. Students with a Standards-Based IEP Standards-Based Goal Section compliance rating of one (mean = 8.782) attained the lowest percentage of growth target attainment on the NWEA. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state compliance expectations in the standards-based goal section demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations.

Table 4.9

Estimated Marginal Means: Reading (IEP SBG Section)

IEP Rating	Mean	Std. Error
0.00	45.453	76.612
1.00	8.782	77.286
2.00	82.683	21.655
3.00	84.402	14.907
4.00	84.176	16.791

Impact of Standards-Based IEP Academic Section Compliance on Math Achievement

A one way Analysis of Covariance (ANCOVA) was conducted using SPSS software to determine if there was a statistically significant difference between the independent variable of each standards-based IEP's Academic Section compliance rating on the dependent variable of percent growth target attainment on the math NWEA, while controlling for disability and least restrictive environment percentage. Levene's test (p = .454) and normality checks were carried out, equal variances were assumed, and the assumptions were met.

As displayed in Table 4.10 *ANCOVA Between-Subjects Effects – Math (IEP Academic Section),* there was no significant difference in percent growth target attainment on the math NWEA [F (3, 72) =.133, p = .940] between the Standards-Based IEP Academic Section compliance ratings, while adjusting for disability and LRE. The partial Eta Squared value of .006 indicates, when compared with Cohen's guidelines, that for Standards-Based IEP Academic Section compliance ratings the effect size was very small, thus indicating the strength of the relationship between these two variables was weak and only 0.6% of the variance in the percent growth target attainment on the math NWEA was explained by the Standards-Based IEP Academic Section compliance rating.

Table 4.10

ANCOVA Between-Subjects Effects – Math (IEP Academic Section)

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Math	Disability	.007	.934	.000
	LRE	4.243	.043	.060
	IEP Academic Section Rating	.133	.940	.006

Result: For reading, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in math as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards in the Academic Section is maintained at the $p < .05$ level. The data suggests that student math achievement was not affected by Standards-Based IEP Academic Section compliance rating after controlling for student disability and student least restrictive environment.

When comparing the estimated marginal means with a Bonferroni confidence interval adjustment, as displayed in Table 4.11 *Estimated Marginal Means: Math (IEP Academic Section)*, it is evident students with a Standards-Based IEP Academic Section compliance rating of three (mean = 87.662) and a Standards-Based IEP Academic Section compliance rating of one (mean = 84.352), attained the second highest percentages of growth target attainment on the NWEA, when the effects of disability and least restrictive environment are removed. Students with a Standards-Based IEP Academic Section compliance rating of two (mean = 77.556) attained the lowest percentage of growth target attainment on the NWEA, when the effects of disability and least restrictive environment are removed. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state expectations in the academic section demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations. However, students whose IEPs received ratings of zero on this section demonstrated, on average, higher achievement than all other students.

Table 4.11

Estimated Marginal Means: Math (IEP Academic Section)

IEP Rating	Mean	Std. Error
0.00	90.988	16.328
1.00	84.352	14.084
2.00	77.556	14.692
3.00	87.662	19.328

Impact of Standards-Based IEP Standards-Based Goal Section Compliance on Math Achievement

A one way Analysis of Covariance (ANCOVA) was conducted using SPSS software to determine if there was a statistically significant difference between the independent variable of each standards-based IEP's Standards-Based Goal Section compliance rating on the dependent variable of percent growth target attainment on the math NWEA, while controlling for disability and least restrictive environment percentage. Levene's test (p = .180) and normality checks were carried out, equal variances were assumed, and the assumptions were met.

As displayed in Table 4.12 *ANCOVA Between-Subjects Effects – Math (IEP SBG Section)*, there was no significant difference in percent growth target attainment on the math [F (4, 65) =.297, p = .879] between the Standards-Based IEP Standards-Based Goal Section compliance ratings, while controlling for disability and LRE. The partial Eta Squared value of .020 indicates, when compared with Cohen's guidelines, that for Standards-Based IEP Standards-Based Goal Section compliance rating the effect size was very small, thus indicating the strength of the relationship between these two variables

was weak and only 2.0% of the variance in the percent growth target attainment on the math NWEA was explained by the Standards-Based IEP Standards-Based Goal Section compliance rating.

Table 4.12

ANCOVA Between-Subjects Effects – Math (IEP SBG Section)

	Source of Variation	F	Significance Level	Partial Eta Squared
Percent Growth Math	Disability	.023	.017	.094
	LRE	6.007	.880	.000
	IEP Standards-Based Goal Section Rating	.297	.879	.020

Result: For math, the null hypothesis that there will be no statistically significant difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards in the Standards-Based IEP Standards-Based Goal Section was maintained at the $p < .05$ level. The data suggests that student math achievement was not affected by Standards-Based IEP Standards-Based Goal Section compliance rating after controlling for student disability and student least restrictive environment.

When comparing the estimated marginal means with a Bonferroni confidence interval adjustment, as displayed Table 4.13 *Estimated Marginal Means: Math (IEP SBG Section)*, it was evident that students with a Standards-Based IEP Standards-Based Goal Section compliance rating of three (mean = 88.683) and a Standards-Based IEP

Standards-Based Goal Section compliance rating of four (mean = 84.664), attained the highest percentages of growth target attainment on the NWEA, after controlling for the effects of disability and least restrictive environment. Students with a Standards-Based IEP Standards-Based Goal Section compliance rating of one (mean = 51.617) attained the lowest percentage of growth target attainment on the NWEA. After controlling for disability and least restrictive environment percentage, students whose IEPs were completely compliant with Maine state compliance expectations in the standards-based goal section demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations.

Table 4.13

Estimated Marginal Means: Math (IEP SBG Section)

IEP Rating	Mean	Std. Error
0.00	67.064	59.745
1.00	51.617	60.256
2.00	70.896	15.704
3.00	88.683	11.400
4.00	84.664	13.192

Summary of Findings

The findings of this research were hampered, not by the acceptable overall response rate of 45.74%, but by the small number of cases that were actually obtained. Due to the discrepancy between the number of cases established by the G*Power Suite as necessary for result validity and reliability ($n = 269$) and the number of obtained cases ($n = 72$), the results of this study are not generalizable to the larger population of Maine

students with high incidence disabilities. However, despite its small size, the sample did demonstrate a suite of notable characteristics. First, while the sample percentages were not equivalent to state percentages, the frequency of the administrative units from which the cases originated mimics the frequency of the various administrative units at the state level. Second, the frequency of the cases did not mimic the statewide frequency of third graders as a percent of each county's overall student population, with significant discrepancies in Knox and Lincoln counties. However, at least one case was submitted from eleven of Maine's sixteen counties. Third, the sample did equally reflect the highest incidence student disability categories in Maine, as the cases consisted of 53.33% students with Specific Learning Disability and 46.67% students with Other Health Impairment. While the results of the study are not generalizable to the larger population, therefore, the diversity of the obtained sample does present the opportunity to examine certain implications of the findings pertaining to Maine state compliant standards-based IEPs and student achievement in math and reading.

Research findings based on the sample ultimately obtained for this study yielded divergent results in the realms of standards-based IEP component compliance and of content area that are indicative of patterns among the obtained data.

Research Question Addressed

1) Are there patterns in compliance of subsections of standards-based IEPs as measured by Maine's General Supervision System Monitoring Tool?

Standards-based IEP ratings were normally distributed, and demonstrated different trends according to section and subsections of the GSS Monitoring Tool. In the academic section of the Tool, the majority of IEPs did not meet expectations in two of the

three subsections, *Academic strengths of the child* and *Academic needs of the child*, and the majority of IEPs met expectations in one of the three subsections, *A statement of the child's present levels of academic achievement.* IEP strengths and needs statements have been held to newly established expectations since the initiation of Maine's standards-based IEP policy in 2014. However, the present level statement has been a required component of IEPs since the passage of the EHA in 1975.

In the standards-based goals section of the GSS Monitoring Tool, the majority of IEPs did not meet expectations in one of the four subsections, Academic *IEP goal alignment,* and the majority of IEPs met expectations in three of the four subsections, *Academic IEP goal formatting*, *Academic IEP goal measurability*, and *Academic goal citation and standard linkage.* The first section, *Academic IEP goal alignment,* addresses higher level content, while the other three sections address formatting of the standards-based IEP goals. Finally, scores in the Standards-Based IEP Goal section were skewed towards the higher scores, while scores in the Academic section were more evenly distributed but slightly skewed towards the lower scores.

Research Question Addressed

2) Is there a statistically significant difference between the math achievement of third grade students with disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

In the math content area, the study's null hypothesis that there would be no statistically significant difference between the achievement of students with disabilities in math as measured by percentage growth target attainment on the NWEA, compared to

students whose IEPs do not meet Maine State compliance standards was accepted. The findings indicate student math achievement is not affected by IEP compliance rating after controlling for student disability and student least restrictive environment. Students whose IEPs were completely compliant with Maine state expectations actually demonstrated lower achievement than those students whose IEPs were not at all compliant with Maine state expectations.

Research Question Addressed

3) Is there a statistically significant difference between the reading achievement of third grade students with disabilities with Maine state compliant standards-based IEPs and of students with disabilities without fully state compliant standards-based IEPs?

In the reading content area, the null hypothesis that there would be no statistically significant difference between the achievement of students with disabilities in reading, as measured by percentage growth target attainment on the NWEA, compared to students whose IEPs do not meet Maine State compliance standards was rejected. The findings indicate student reading achievement was affected by IEP compliance rating after controlling for student disability and student least restrictive environment. Students whose IEPs were completely compliant with Maine state expectations demonstrated higher achievement than those students whose IEPs were not at all compliant with Maine state expectations. Further examination of the estimated marginal means for the compliance ratings in both sections, indicate unique patterns in achievement and IEP compliance rating that are best explained in a review of external factors that were not directly targeted within the research parameters of this research. The study's findings,

therefore, demonstrate variable compliance patterns in the sections of standards-based IEPs, as well as conflicting patterns regarding the significance of the impact of standards-based IEPs on student achievement in the content areas targeted in this study.

Chapter Five: Conclusions

Introduction

The task of improving the outcomes and achievement of students with disabilities has long been an enigmatic endeavor. Indeed, despite significant shifts in case law and in educational programs since the passage of the Education of All Handicapped Children Act of 1975, with few exceptions, the achievement of students with disabilities is still not commensurate with their nondisabled peers (Hocutt, 1996). This trend is particularly concerning given the significant allocation of funds for special education programs at the local, state, and federal levels. According to the NEA (2017), for example, the average per student cost for a special education student is $16,291, as compared to the average cost of a regular education student, $7,552. In Maine, special education is the fastest growing cost large center in Maine school districts; in 2006, statewide special education spending represented 14.6% of all K-12 educational spending and in 2013, it represented 16.2% (Donaldson, 2016). Despite these expenditures at the national and state levels, however, the achievement of students with disabilities remains low, particularly in comparison to their non-disabled peers.

Lagging achievement levels of students with disabilities may be partially attributed to the reality that initial political, legal, and social advocacy efforts for this population focused primarily on simply ensuring students with disabilities could access public educational programs and services. Most prominently, the Supreme Court's ruling in *PARC v. Commonwealth of Pennsylvania* (1972) established the right of children with disabilities to public education and the EHA (1975) provided states with avenues to obtain necessary fiscal supports. These two prominent legal and political initiatives

established the program framework for students with disabilities; a framework that would, upon the advent of the NCLB Act (2001) and the 2004 reauthorization of the IDEA, eventually shift its focus from ensuring children with disabilities could access general education opportunities and programs to ensuring students with disabilities had the opportunity to achieve at high levels.

The shift in focus from access to opportunity laid the foundation for the standards-based IEP initiative. This initiative was designed to ensure students with disabilities were exposed to, and made progress in, "the general education curriculum on their grade level to the greatest extent possible" (Samuels, 2013, p. 24). Across the country, states worked to adhere to accountability expectations set by the NCLB Act (2001), and to shift special education practices towards a more inclusive approach. In Maine this shift accompanied the proficiency-based diploma initiative that began with The Act to Prepare Maine People for the Future Economy (2011), often referred to as LD 1422. Despite the controversies associated with LD 1422, Maine developed its 2014 "Policy on Standards-Based IEP Goals" to bring clarity to the proficiency-based diploma initiative as it pertained to special education students. This controversial Policy placed great emphasis on ensuring children with disabilities were held to LD 1422's 'all students, all standards' mandate, and were supported in their mastery of those same standards. The Policy had far-reaching impacts on special education practices in Maine in terms of student learning, student readiness for graduation, educator capacity, and accountability measures. A special education teacher, cited by Stump, Johnson, and Jacobs (2017) in their study of the impact of proficiency-based diploma systems on special education in Maine, recognized that special educators:

> have started tying a lot of our IEP goals to the Common Core, really pushing kids to reach grade level, really harder than we'd pushed kids to make gains before. I think that's been a positive. On the other hand, it's hurting our kids, too. We have kids who can't meet those standards, who developmentally cannot keep up. So, even if they keep on track with their attainable goals, they will never earn a diploma. (p. 24)

Despite the prevalence of standards-based IEP initiatives at the federal and state levels, there a continued dearth of empirical research in regards to the actual efficacy of standards-based IEPs as they relate to student achievement, and what research is available focuses on specialized, low incidence student populations. Pretti-Frontczack and Bricker (2000) for example, noted there is "little empirical evidence" available to support claims about a relationship between IEPs and student achievement (p. 93), while La Salle, Roach, and McGrath (2013) found "IEP quality was not a significant predictor of [student] test performance or curricular access" (p. 142). No one knows whether standards-based IEPs have a positive, neutral, or negative impact upon the achievement of students with disabilities. In an attempt to address the evident gap in the research, therefore, this quantitative study was designed to measure the significance of the impact of Maine state compliant standards-based IEPs on the achievement of third grade students with high incidence disabilities in math and reading.

Summary of the Study

The purpose of this two stage quantitative study was to assess, through an analysis of covariance (ANCOVA), the significance of the impact of Maine state compliant standards-based IEPs on the math and reading achievement of third grade

students with high incidence disabilities as measured by the Northwest Evaluation Association Measures of Academic Progress assessment. The data for this study was collected directly from acting public special education administrators in Maine's public school administrative units. Descriptive data pertaining to IEP compliance with the various Policy mandated IEP components was collected and analyzed. ANCOVAs were conducted independently for both math and reading to determine the impact that a standards-based IEP's overall level of compliance with Maine state expectations had on student achievement, while controlling for student disability and least restrictive environment percentage. The study's parameters were designed to produce a sample that was representative of the larger population of Maine students with high incidence disabilities. However, due to SAU non-response to data solicitation efforts, SAU lack of student population meeting the specifications of the study, and SAU use of alternative formative assessment tools, the collected sample of 72 cases ($n = 72$) was far less than anticipated, and thus limited the generalizability of the study's results.

Sample

Overall response rate. An overall response rate of 45.74% was obtained for this study; of the 188 SAU special education administrators contacted, 86 responded and 102 did not respond. Although the final number of cases obtained was minimized due to a number of environmental factors, the actual response rate was not a limiting factor in the study.

Acceptable response rates. Due to the small size of the sample, a brief review of survey and participation response rates in research studies is applicable here. Further, while this study was not dependent on surveys, it was dependent upon data from those

individuals who had access to the required cases. Response rates are defined by the American Association for Public Opinion Research as the number of completed units divided by the number of eligible units in the sample (Fan and Yan, 2009).

In a large scale quantitative analysis designed to identify reasonable response rates in academic studies, Baruch (1999) stated that, while studies need high response rates "from a wide representation of the whole population under study" in order to have "dependable, valid, and reliable results...it is up to the target population to decide whether or not to respond" (p. 422). Baruch (1999), in a review of five journals, found that average response rates for studies declined from 64.4% in 1975 to 48.4% in 1995, yielding an average response rate of 55.6%, with a standard deviation of 19.7. Given the variety of researched factors, Baruch (1999) concluded that, for most studies, a response rate of about 60 +/- 20 % should be sought, and any deviation from this range should be explained.

Fan and Zen (2009) indicated email and web surveys have an approximately 10% lower response rate than other methods such as telephone and regular mail. Their findings were corroborated by Cook, Heath, and Thompson (2000), who established, in their meta-analysis of response rates in web or internet based surveys, an acceptable mean response rate of 34.6%. Data collection methods for this study relied heavily on email communications, as well as telephone follow-ups and in-person interactions when appropriate. The overall response rate for this study's data request of 45.74% falls within the generally acceptable range of 40-60-80 % established by Baruch (1999), as well as within the expected range for web based response rates, which are generally expected to be 10% less than other methods.

Nonresponse bias. Low response rates are not assumed to cause unacceptable levels of bias. In a meta-analysis of fifty-nine methodological studies, designed to estimate the magnitude of nonresponse bias in statistics of interest, Groves and Peytcheva (2008) examined studies with nonresponse rates ranging from 14 to 72%. They found that high levels of bias can occur in studies with high response rates, and low levels of bias can occur in studies with low response rates. Keeter, Hatley, Kennedy, and Lau (2017) expanded this idea in their examination of what low response rates meant for telephone surveys, as they found response rate "is an unreliable indicator of bias" (p. 1). Despite the small size of the sample and the overall response rate of 45.74%, bias is not inherent in this study.

Sample characteristics. The sample ($n = 72$) did not meet the standards for generalizability as it represented only 26.77% of the number of IEPs ($n = 269$) identified using the G*Power Tool as necessary for a generalizable sample (Faul et al., 2007). However, despite the limitations associated with its size, the sample did exhibit some representative features for the Maine population of third grade special education students identified under the disability categories of Specific Learning Disability and Other Health Impairment. First, the sample cases were equally representative of each disability category. Second, the sample was distributed throughout the state with a frequency similar to the state trends in regards to the type of administrative unit from which the sample was obtained. School administrative unit governance and management structures can affect the procedures and educational experience of students; thus, the sample's representative nature of these units is important. Third, the sample was uniquely distributed in accordance with student population and county. Variables affecting the

submission of samples by county included overall student population and number of administrative districts within the county, the average socio-economic status of the county as some counties with lower overall socio-economic statuses lacked the funding for the administration of the NWEA MAP assessment for their students, and the location of the county, as school districts in southern Maine counties had shifted from the use of the NWEA MAP assessment to the use of the STARR assessment. These variables combined to limit the final number of samples to (n = 72), despite the acceptable overall response rate to the actual request for data of 45.74%.

Discussion of Results

Standards-based IEP academic section compliance review. The IEP compliance rating obtained for this study was telling in regards to evident levels of special educator skill and adherence to standards-based IEP expectations.

APG2, Section 6A: Academic strengths of the child. This component of the GSS Monitoring Tool was designed to assess the IEP's statement of academic strengths of the child (Maine Department of Education, 2016). Maine's Special Education Required Forms Procedural Manual (2019) specifies

> This section includes relative and statistical strengths from the initial or most recent evaluations, but should go beyond information from evaluations including but not limited to observable strengths. What skills does this child have? (p. 24)

Of the sample of 72 IEPs (n = 72), 68.06% of IEPs did not meet expectations in this area, and 31.94% of IEPs did meet expectations in this area. These findings are indicative of special educators' struggles to fully articulate student academic strengths. This is particularly problematic because "determining the gaps between the student's current

level of academic achievement and the expectations for grade-level performance provides a clear picture of what needs to be accomplished" over the course of the student's annual IEP (Cortiella, 2008, p. 3). Special education programs that reinforce an incomplete understanding of student strengths could lead to the development of misguided or inappropriate special education programs that do not remediate student deficits.

APG3, Section 6A: Academic needs of the child. This component of the GSS Monitoring Tool was designed to assess the presence and completeness of the IEP's statement of academic needs of the child. The IEP needs to explicitly address how the student is doing in the content area curriculum (Maine Department of Education, 2016). Maine's Special Education Required Forms Procedural Manual (2019) further clarifies that academic needs should

> identify (list) specific academic skill deficits that are to such a degree, that they need to be aligned to an annual goal and addressed through a provision of service. Academic skill deficits can be identified based on formal or informal evaluations, academic performance and observation, and formative and summative assessments. Ensure that each identified academic need is being addressed through at least one academic annual goal. (p. 24)

Of the sample of 72 IEPs ($n = 72$), 54.17% of IEPs did not meet expectations in this area, and 45.83% of IEPs did meet expectations in this area. While a greater number of IEPs met expectations in this area than in the academic strengths section, a majority of the IEPs still did not meet expectations in this area. This is further indication of special educators' struggle to fully articulate the needs arising directly from students' disabilities. This is of concern as it pertains to the efficacy of special education programs, as student

"IEPs must contain annual academic and functional goals that are designed to meet those needs that directly result from the child's disability" (McLaughlin, 2009, p. 2). If student needs in the educational realm are not properly identified, educators could again develop misguided or inappropriate special education programs that do not remediate student deficits.

APG4, Section 6A: A statement of the child's present levels of academic achievement. This component of the Monitoring Tool was designed to assess the presence and completeness of the IEP's statement of the child's present levels of performance and how the child's disability affects the child's involvement and progress in the general education curriculum (Maine Department of Education, 2016). Maine's Special Education Required Forms Procedural Manual (2019) specifies "a statement of the child's current academic performance (baseline data) should align with all identified academic skill deficits listed in the Needs section" (p. 24).

Of the sample of 72 IEPs ($n = 72$), 38.89% of IEPs did not meet expectations in this area, and 61.11% of IEPs did meet expectations in this area. A majority of IEPs met expectations pertaining to the child's present level of performance statement, indicating that special educators demonstrate the capacity to craft an overall statement of student academic performance. Notably, while specifications for the present level of performance have existed since the passage of the EHA in 1975, only since the SPDG trainings associated with Maine's 2014 Policy on Standards-Based IEP Goals have special educators in Maine been required to construct strengths and needs in the manner specified above. The differences in performance ratings on standards-based IEP's

academic section may be related to a lack of special educators' experience in creating strengths and needs statements.

Standards-Based IEP Goal Section compliance review.

SBG1, Section 6A: Academic IEP goal alignment. This component of the GSS Monitoring Tool was designed to assess the alignment of the student's academic goals with the student's needs and present levels of academic performance, and to assess how such goals may facilitate the student's achievement of grade level Maine Learning Results (Maine Department of Education, 2016). Additionally, Maine's Special Education Required Forms Procedural Manual (2019) specifies that

> when writing goals, there should be a direct alignment between an identified need, present level of performance and annual goal that allows the child to be involved and make progress in the general curriculum while receiving a provision of service (p. 24).

Of the sample of 72 IEPs ($n = 72$), eight IEPs were not rated in this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 51.56% of IEPs did not meet expectations in this area, and 48.44% of IEPs did meet expectations.

Again, the relatively new specifications pertaining to the creation of standards-based IEP strengths and needs may have contributed to special educators' struggles, as a majority of IEPs did not meet expectations in this area. Standards-based IEPs that lack fully articulated and appropriate academic strengths and needs, as well as properly aligned academic annual IEP goals, do not meet state compliance standards. This may have significant implications pertaining to quality of related special education

programming; the degree to which programming aligns with standards is a determining factor in student achievement as shown by McDonnell et al.'s (1997) correlation between the intensity of curriculum and student achievement.

SBG2, Section 6A: Academic IEP goal formatting. This component of the GSS Monitoring Tool was designed to assess the structure of standards-based IEP goals, and to ensure goal formatting meets State expectations as per the formatting specifications of: (what date), given (conditions), student will (do what observable behavior), as measured by (assessment or other) (Maine Department of Education, 2016). Of the sample of 72 IEPs ($n = 72$), eight IEPs were not rated in this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 12.5% of IEPs did not meet expectations in this area, and 87.5% of IEPs did meet expectations in this area. A solid majority of special educators demonstrated competence in this realm, as they have the capacity to create IEP goals with the Maine Department of Education's specified components and formatting.

SBG3, Section 6A: Academic IEP goal measurability. This component of the GSS Monitoring Tool was designed to assess the measurability of the standards-based IEP goals in terms of their inclusion of data or activities to be measured by score, percent, frequency, or a specific demonstration of mastery (Maine Department of Education, 2016).

Of the sample of 72 IEPs ($n = 72$), eight IEPs were not rated by this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 14.06% of IEPs did not meet expectations in this area, and 85.94% of IEPs did meet expectations in this area. Again, a

solid majority of special educators demonstrated competence in this area, as they have the capacity to create IEP goals that meet the Maine Department of Education's expectations for measurability.

SBG4, Section 6A: Academic goal citation and standard linkage. This component of the GSS Monitoring Tool was designed to assess whether or not the standards-based IEP goals have citations linking them to grade level (or grade span) general education curriculum standards (Maine Department of Education, 2016). Maine's Special Education Required Forms Procedural Manual (2019) specifies "goals should also be aligned with The Maine Learning Results: Parameters for Essential Instruction and Guiding Principles" (p. 25). Of the total collected sample of 72 IEPs (n = 72), eight IEPs were not rated by this section, as the students did not present with academic needs, and, therefore, did not have academic goals. Of the 64 IEPs that contained academic goals, 14.06% of IEPs did not meet expectations in this area, and 85.94% of IEPs did meet expectations in this area. Again, a majority of special educators demonstrated competence in this area, as they have the capacity to create IEP goals that meet the Maine Department of Education's expectations for properly citing standards to which goals are aligned.

A majority of IEPs met compliance expectations in this section of the IEP, as most IEPs met expectations in at least three of the four subcategories. Notably, this section addresses one part higher level content (SBG1) and three parts formatting of the standards-based IEP goals (SBG2, SBG3, SBG4). While the percentages of IEPs meeting expectations in SBG1, Section 6A: Academic IEP goal alignment were similar to the percentages of IEPs meeting expectations in the Academic Section, the percentages

of IEPs meeting expectations in SBG2, SBG3, and SBG4, 87.5%, 85.94%, and 85.94% respectively, were significantly different.

As evidenced here, the special educators who created the IEPs have mastered the procedural and detail oriented expectations for standards-based IEPs, but may have not mastered the higher level content and techniques necessary for meeting compliance expectations for standards-based IEPs. Cathcart et al. (2009) surmised IEPs that ensure students can access, participate in, and make progress in the regular education curriculum "unquestionably improve student outcomes" because they help to "close the achievement gap for students with disabilities" (p. 1). Further, in their research pertaining to the importance of professional development in enhancing the quality of IEP goals and objectives, Pretti-Frontczack and Bricker (2000) highlighted the assumption that "quality IEP goals and objectives result in more effective intervention" (p. 101). While these claims remain unproven, the conclusion that a majority of standards-based IEPs met expectations in procedural components and did not meet expectations in content components has implications for the levels of the compliance and quality of the IEPs themselves.

Student math achievement. The findings of this study verified the null hypothesis that there is no statistically significant difference between the achievement of students with disabilities in math, as measured by percentage growth target attainment on the NWEA, compared to students whose IEPs do not meet Maine State compliance standards. In addition to the non-significant result of the ANCOVA, the effect size for IEP Compliance Rating was small, thus indicating the strength of the relationship between these two variables was weak and only 4.7% of the variance in the Percent

Growth Target Attainment on the Math NWEA was explained by the IEP compliance rating. Further analysis using a Test for the Assumption of the Homogeneity of Regression Slopes indicated that interaction effects were non-significant. As such, the data suggests student math achievement was not affected by IEP compliance when controlling for student disability and student least restrictive environment percentage. It is evident that, for this study's sample, an IEP's level of compliance with Maine state expectations for standards-based IEPs had no discernible impact on student math achievement as measured by the NWEA MAP assessment.

This finding is concerning in regards to its implications for the students represented in this study's small sample, as well as its possible implications for students with high incidence disabilities throughout Maine. The Policy on Standards-Based IEP Goals begins with the following quote obtained from federal documents designed to support the implementation of IDEA (2004) and NCLB (2002), "Being in special education does not mean that a student cannot learn and reach grade-level standards." Maine's Policy is designed, through its specifications regarding the various components of standards-based IEPs, to purposefully emphasize an "all students, all standards" approach as the means by which students with disabilities can achieve at the same high levels as their non-disabled peers. The GSS Monitoring Tool is aligned with the expectations of this Policy, and provides measurement regarding degree of IEP compliance with state mandated expectations for standards-based IEPs. The results of this study imply that, regardless of the level of student inclusion in the least restrictive environment, or the high incidence disability category under which a student is eligible,

the Policy specified construction of standards-based IEPs does little to enhance the math achievement of students with disabilities.

A review of the estimated marginal means using the Bonferroni confidence interval adjustment further illuminates the complexity of these findings. It was hypothesized that students with the lowest overall IEP compliance ratings would demonstrate the least percentages of growth target attainment on the NWEA, while students with the highest overall IEP compliance ratings would demonstrate the highest percentages of growth target attainment on the NWEA. In fact, students with the lowest overall IEP compliance rating of one and the highest overall IEP compliance rating of four attained the highest percentages of growth target attainment on the NWEA, when the effects of disability and least restrictive environment were removed. As displayed in *Figure 5.1*. IEP Compliance Rating Compared to Mean Growth Target Percentage on the Math NWEA, students with an overall IEP compliance rating of 1.5 and an overall IEP compliance rating of 3 attained the lowest percentages of growth target attainment on the NWEA when the effects of disability and least restrictive environment percentages were removed. A trendline applied to these data indicates there was a complete lack of, or even slightly negative relationship between IEP compliance rating and mean growth target percentage.

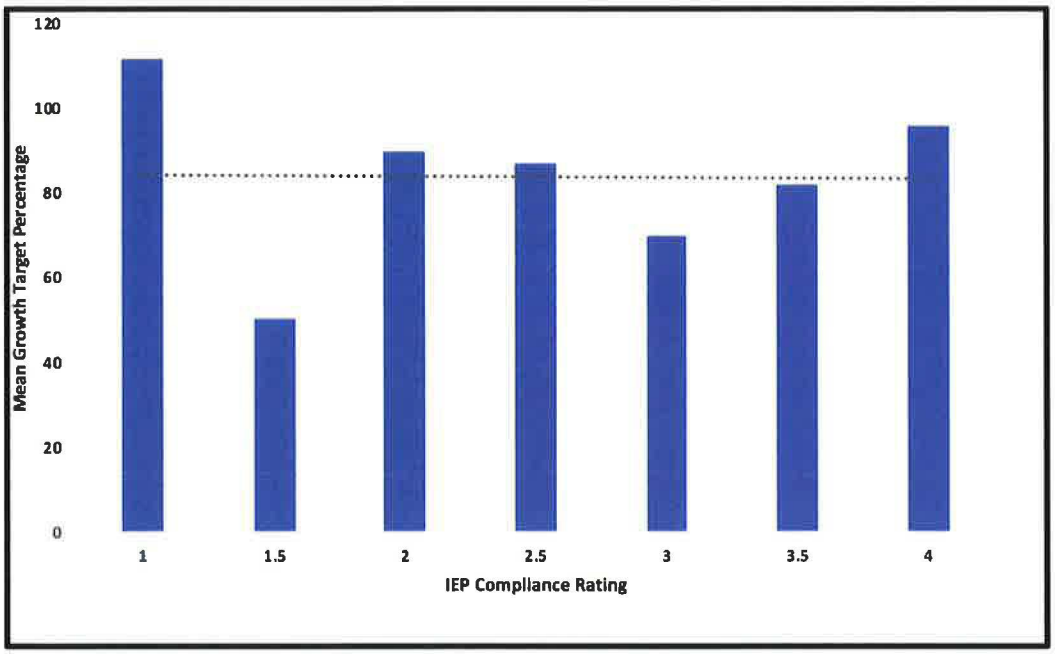

Figure 5.1. IEP Compliance Rating Compared to Mean Growth Target Percentage on the Math NWEA

This further indicates standards-based IEPs may, at best, have no impact on student achievement at all and may possibly even dampen levels of student achievement in this content area.

Additional discussion is necessary, however, regarding the IEPs that received overall compliance ratings of one. While some of those were completely noncompliant with Maine's standards-based IEP expectations, others received this rating because there were no academic goals present on the IEP. This appears to be a construct failure of the GSS Monitoring Tool itself, as lack of academic goals may be due to an educator's failure to devise such goals or due to the fact a student has only functional needs and is performing on par with his or her peers in the realm of academics. IDEA (2004) specifies IEPs must include measurable annual goals, including academic and functional

goals, that are designed to meet the child's needs resulting from the child's disability; in certain cases, a child's disability does not create academic needs.

High levels of student achievement may be expected on some IEPs that received an overall compliance rating of one because a score of one can be interpreted to mean either the student's IEP was completely noncompliant with state expectations or the student was performing on par with his or her peers in the realm of academics. As illustrated by *Figure 5.2.* Adjusted IEP Compliance Rating Compared to Mean Growth Target Percentage on the Math NWEA, when the estimated marginal mean for the IEPs with overall compliance ratings of one was removed from the data set, the trend line changed significantly. This indicated the presence of a positive relationship between IEP compliance rating and mean growth target percentage on the math NWEA.

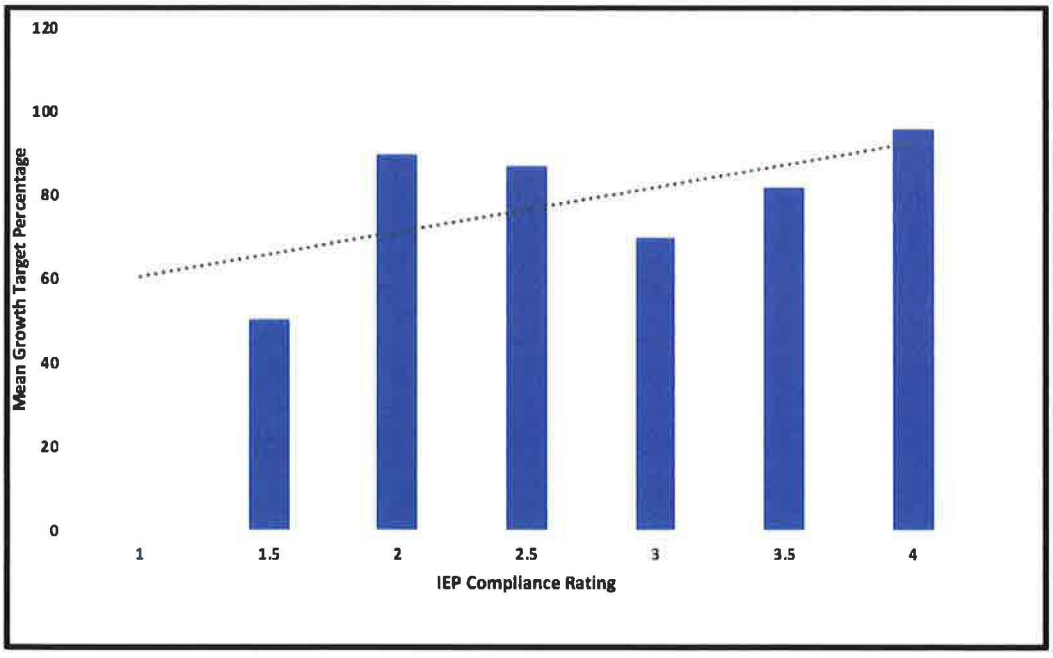

Figure 5.2. Adjusted IEP Compliance Rating Compared to Mean Growth Target Percentage on the Math NWEA

While this removal does not change the significance of the relationship between standards-based IEP compliance and student achievement in math, it does have implications regarding the presence of further, unpredicted variables that may have affected the outcomes of this study.

Student reading achievement. The findings of this study led to a rejection of the null hypothesis that there is no statistically significant difference between the achievement of students with disabilities in reading as measured by percentage growth target attainment on the NWEA as compared to students whose IEPs do not meet Maine State compliance standards. The data suggests that student reading achievement is affected by IEP compliance when controlling for student disability and student least restrictive environment percentage. In addition to the significant result of the ANCOVA, however, the effect size for IEP Compliance Rating was relatively small, thus indicating the strength of the relationship between these two variables was relatively small. Further analysis with a Test for the Assumption of the Homogeneity of Regression Slopes indicated that interaction effects were non-significant. It is evident, therefore, that for this study's sample, an IEP's level of compliance with Maine state expectations for standards-based IEPs, as specified in its 2014 Policy on Standards-Based IEP Goals, did have minimal impact on student reading achievement as measured by the NWEA MAP assessment. This finding is concerning in regards to its implications for the students represented in this study's small sample, as well as its possible implications for students with high incidence disabilities throughout Maine, particularly in view of its contrasting result with the findings pertaining to student math achievement. Further, this study implies, that regardless of the level of student inclusion into the least restrictive

environment or of the high incidence disability category under which a student is eligible, the Policy specified construction of standards-based IEPs has minimally enhanced the reading achievement of students with disabilities.

A review of the estimated marginal means using the Bonferroni confidence interval adjustment further illuminates the complexity of these findings. It was hypothesized that students with the lowest overall IEP compliance ratings would demonstrate the least percentages of growth target attainment on the NWEA, while students with the highest overall IEP compliance ratings would demonstrate the highest percentages of growth target attainment on the NWEA. As displayed in *Figure 5.3*. IEP Compliance Rating Compared to Mean Growth Target Percentage on the Reading NWEA, students with the overall IEP compliance rating of two and the highest overall IEP compliance rating of 3.5 attained the highest percentages of growth target attainment on the NWEA, when controlling for the effects of disability and least restrictive environment percentage. Students with an overall IEP compliance rating of one and an overall IEP compliance rating of 1.5 attained the lowest percentages of growth target attainment on the NWEA when controlling for the effects of disability and least restrictive environment percentage. A trendline applied to these data indicates there was a positive relationship between IEP compliance rating and mean growth target percentage on the reading NWEA.

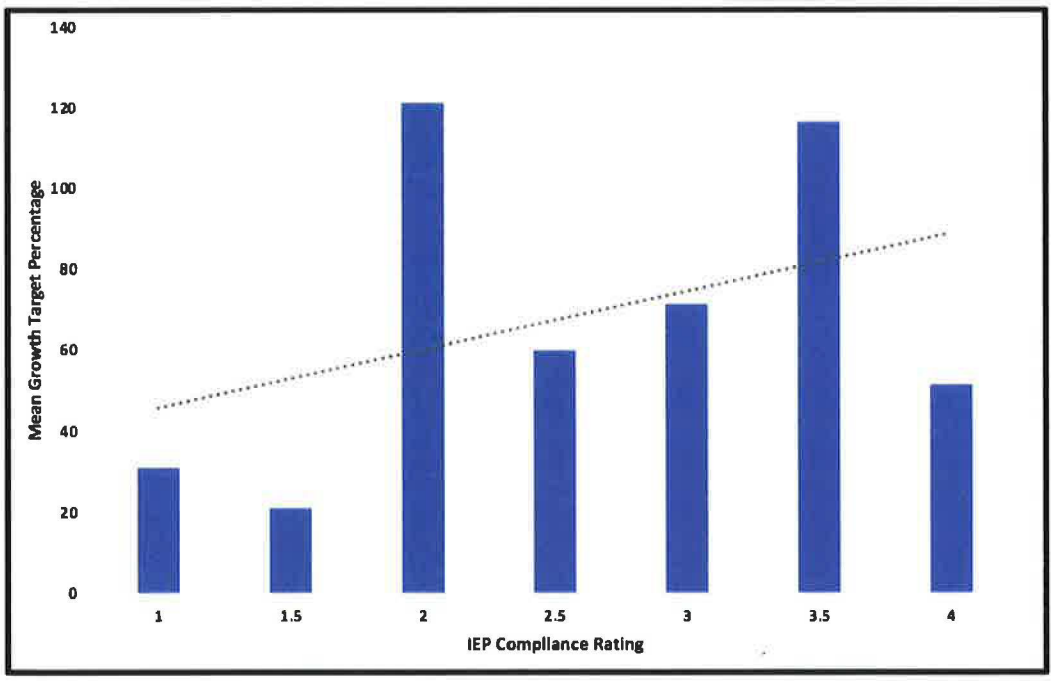

Figure 5.3. IEP Compliance Rating Compared to Mean Growth Target Percentage on the Reading NWEA

These findings further indicate standards-based IEPs may positively impact student achievement in reading, though the impact is indeed variable across overall IEP compliance ratings.

Unlike the data set associated with math achievement, if the estimated marginal mean for the IEPs with an overall compliance rating of one is removed from the data set, the trend line does not change significantly, and slightly flattens. As displayed in *Figure 5.4*. Adjusted IEP Compliance Rating Compared to Mean Growth Target Percentage on the Reading NWEA, there is a continued positive relationship between IEP compliance rating and mean growth target percentage on the reading NWEA.

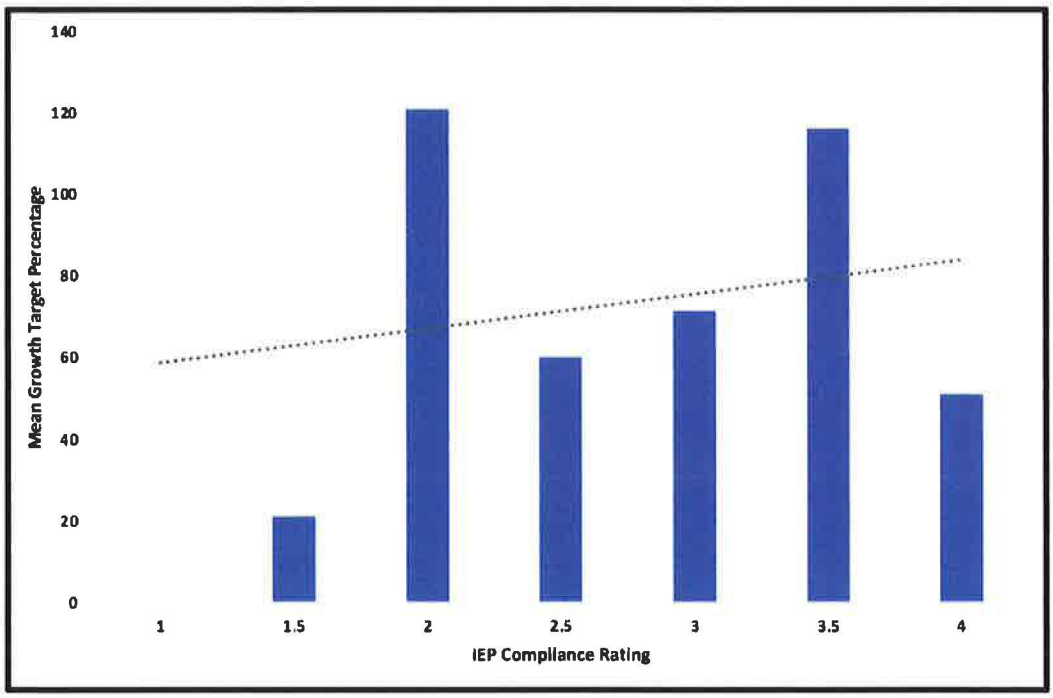

Figure 5.4 Adjusted IEP Compliance Rating Compared to Mean Growth Target Percentage on the Reading NWEA

This removal decreases the significance of the relationship between standards-based IEP compliance and student achievement in reading. Further research is necessary, therefore, to understand why standards-based IEP compliance rating would significantly impact student achievement in reading, but not significantly impact student achievement in math.

Implications for Policy and Practice

Standards-based IEP policy revisions. Maine's Policy on Standards-Based IEP Goals was developed in response to an acute need to increase the achievement of students with disabilities and to aid their efforts to obtain a high school diploma under the specifications for standard mastery established by L.D. 1422. The dearth of empirical research pertaining to the impact of standards-based IEPs on student achievement was problematic, as the Policy was implemented with no real verification of efficacy.

Additionally, the Policy had significant impact on special education practices in Maine. Special educators were required to shift their perspectives regarding the potentials of their students and to create IEPs that incorporated a deeper understanding of the general education curriculum, standards-based instructional approaches, and techniques. These research findings are concerning in that they indicate the potential that, despite their promotion both in policy and in practice, standards-based IEPs do not have significant impact on student achievement in math and have a minimally significant impact on student achievement in reading. If this is the case, the Policy on Standards-Based IEP Goals is misguided in its singular focus on document compliance. It remains to be seen if future studies designed to be generalizable to the population of Maine students with the high incidence disabilities of Other Health Impairment and Specific Learning Disability obtain similar results.

The initial failings of the 2014 Policy on Standards-Based IEP Goals were partly addressed in the 2015 revisions that reduced the emphasis on the incorporation of grade level goals in student IEPs. However, continued controversies are associated with its perceived alignment with the proficiency-based diploma law as well as its disproportionate focus on IEP goal structure. In general, IEPs are considered "the most important legal document written for students with disabilities" and, while goals are considered the foundation of the IEP, other components are equally necessary and important (Pierangelo and Giuliani, 2017, p. vii).

In order to facilitate change that reaches beyond the level of compliance with IEP formatting to the realm of actual student progress, the Standards-Based IEP Policy must incorporate standards for IEP structure, implementation, and results that are also based on

the premise that students must make "progress towards the achievement of grade-level academic standards" (Maine Department of Education, 2015). In recognition of the statewide progress that has been made in districts' implementation of certain components of this Policy, its recommended that three existent components of the Policy be revised in such a manner (and not replaced) that maintains its current components while broadening the Policy's focus and accountability measures.

Title revision. A standards-based Individualized Education Program (IEP) is document that is framed by a state's general curricular standards and that contains annual goals aligned with, and chosen to facilitate the student's achievement of, grade level academic standards, wherever appropriate (Maine Department of Education, 2015; Cortiella, 2008). In general, standards-based IEPs are known to ensure students have improved exposure to general education subject matter, to increase collaboration between regular and special educators, to enhance expectations for students with disabilities, and to improve teachers' pedagogy (MacQuarrie, 2008). While standards-based goals are key components of a standards-based IEP, they cannot stand alone and, therefore, cannot singularly guarantee an effective special education program. A proposed revision to the current Policy includes a change of the title from "Policy on Standards-Based IEP Goals" to "Policy on Standards-Based IEPs." In so doing, the Policy will emphasize the importance of all current components of the document and will reduce the Policy's perceived singular focus on the historically controversial grade level standards based IEP goals.

Expanded focus. Standards-based IEP goals are, as articulated in the current Policy (2015), "based on the student's strengths, weaknesses and needs. Goals must also

be based on the student's present level of academic and functional performance" (p. 1). Reconfiguration of the Policy's stipulations for specified IEP content is essential to ensuring that special educators recognize the importance of the programmatic connection between a student's strengths, needs, present levels, and goals, and articulate them as such. These proposed revisions, in effect, expand the target of the Policy to standards-based IEPs in their entirety, thereby ensuring greater emphasis not only on the goal structure, but on the content of the IEP and associated programming.

The Massachusetts Department of Education (2001) articulated the importance of a carefully constructed, holistic IEP in regards to improving a student's educational outcomes when it noted that "the IEP should describe how the student learns, how the student best demonstrates that learning and how the school staff and student will work together to help the student learn better" (p. 12). Educators in Indiana also noted the importance of this understanding in their state's definition of a standards-based IEP, which is meant to capture "the approximations to support the student's movement toward proficiency at grade level" (Ahearn, 2010, p. 5). A holistic standards-based IEP, not just the presence of standards-based IEP goals, is widely recognized as a means by which schools can increase student achievement.

Monitoring specifications. Additionally, the Maine Department of Education currently monitors districts for special education compliance using the state's GSS Monitoring Tool. As specified in the Policy, beginning in 2016-2017, Maine's Department of Education "expect [ed] to find standards-based academic goals in each IEP it reviews" The Department accordingly reconfigured the GSS Monitoring Tool to include components that evaluated SAU adherence to standards-based IEP requirements.

In recognition of the need to expand the Policy to govern standards-based IEPs, certain existent components of the Tool could be used to measure district compliance with the expectations. As indicated by the differing results in student achievement in math and reading as they relate to standards-based IEP compliance, students would be better served by a Policy that targets not only the formatting and structure of the standards-based IEP goals, but the formatting and structure of the entire IEP as well as the programming necessary to support student mastery of designated IEP goals.

Standards-based IEP professional development considerations. To facilitate increased achievement of students with disabilities, additional shifts in practice are necessary, including additional supports to special educators working to meet standards-based IEP expectations. The Maine Department of Education introduced the mandate for standards-based IEPs in 2014 with its first iteration of its Policy on Standards-Based IEP Goals. The Department supported its mandate by providing multiple professional development sessions throughout the state's Superintendent regions. The professional development sessions focused on developing special educators' abilities to create and implement standards-based IEPs. However, the Department of Education did not integrate its expectations for standards-based IEPs into its General Supervision Monitoring System until the 2016-2017 school year. While special educators have worked to implement these techniques since 2014, a statewide mandate for the implementation and use of standards-based IEPs did not exist until 2016-2017. Continued opportunities for targeted professional development and practice, therefore, have been relatively limited.

As noted by Pretti-Frontczak and Bricker (2000) and Roach and Elliot (2006), high quality professional development designed to target standards aligned IEP goal construction can improve special educators' abilities to develop standards-based IEP goals. Further, Karvonen and Huynh (2007) suggested that special educators "who have operated outside of the general education curriculum for many years" need professional development in a myriad of areas in order for student IEPs to positively influence the alternate assessment performance of students with significant cognitive disabilities. Additional professional development is needed to provide special educators with opportunities for instruction and practice pertaining to standards-based IEP construction. These efforts are essential to develop special educators' familiarity with standards-based content, to practice effective standards-based IEP construction techniques, and to expand their capacity to implement standards-based instruction in the content areas of math and literacy.

Deliberate practice. Development of teacher competence, and even expertise, in any specified area of need is frequently associated with teachers' engagement in deliberate practice. Ericsson, Krampe, and Tesch-Romer (1993) described deliberate practice as those activities which are purposely designed to improve performance, require significant personal effort to initiate and maintain, and are performed frequently. The amount of time spent in deliberate practice relates directly to the level of performance of the individual (Ericsson, 1993).

In their studies of strategies teachers use to improve their practices, Dunn and Shriner (1999) defined deliberate practice as teaching in a more "deliberate way" through increased time spent planning, being fully mindful throughout their practice, and in

"choosing to be effortful-making changes when teaching seems to be going well, trying to find an even better way, trying to reach a particular child, trying to solve a particular problem" (p. 647). In order to reach a level of competence and/or expertise, it seems, educators must spend more time performing the tasks associated with their roles. Time to practice is an essential component to improving performance.

Given these factors, a partial explanation for the variance in performance in the academic section of standards-based IEPs relates to special educators' available time for practice. A majority of IEPs did not meet compliance expectations in the *Academic strengths of the child* and *Academic needs of the child* subsections, while a majority of IEPs did meet compliance expectations in the *Statement of the child's present levels of academic achievement* subsection. As noted previously, the specifications for the present level of performance have existed since the passage of the Educational for Handicapped Children Act of 1975, but special educators in Maine have been required to construct strengths and needs statements according to current specifications only since the issuance of Maine's first Policy on Standards-Based Goals in 2014. The time available for deliberate practice, associated professional development, and other efforts to develop competency in this area has been less than that available for the same activities pertaining to present level statements. This differential in the passage of time since the establishment of initial expectations for each component may, therefore, be a factor in the subsequent differential levels of compliance. The allocation of more professional development time for supported, deliberate practice opportunities on both the local and state levels is a necessary component of further developing special educators' capacity to create compliant, and effective, standards-based IEPs.

Taxonomy of learning. Robert Marzano (2009) classified two broad types of knowledge in his research on how all educators effectively design and teach learning goals and objectives for their students. Declarative knowledge, which is informational in nature, and procedural knowledge, which involves skills, strategies, and processes, relate to the process of thinking and learning as articulated in *Marzano's New Taxonomy* (2000). Declarative and procedural knowledge are also associated with the Taxonomy's division of the cognitive system into tiers of knowledge retrieval, comprehension, analysis, and knowledge utilization, which are arranged in order of increasing complexity and advanced levels of cognition. Learning opportunities and mastery of content begin at the more simplistic information and knowledge retrieval levels and move through the higher tiers as learners develop and become proficient with content.

Although Marzano's research targets student learning, the concepts are applicable to this research. As evidenced by the patterns in subsection compliance in the standards-based goals section of the standards-based IEPs examined for this study, special educators generally demonstrated mastery of the IEP sections and skills that pertained to the low demand realm of declarative knowledge. Attaining compliance in these realms required the basic cognitive skills of knowledge retrieval associated with recognizing, recalling and executing.

However, special educators struggled considerably in the realms of the IEP that pertained to procedural knowledge, as evidenced by the finding that the majority of special educators did not meet expectations in *Academic IEP goal alignment.* This section of the GSS Monitoring Tool requires skills associated with levels of procedural knowledge on the part of special educators. To attain compliance in this realm, special

educators must problem solve and make decisions in order to align a student's goals with his or her needs and present academic levels. These skills are associated with the higher level cognitive realm of knowledge utilization. Given these findings, the pattern of special educator mastery of subsections requiring more basic learning and special educator struggles with subsections requiring mastery of higher level content and skills again emphasizes the need for structured professional development opportunities that facilitate special educators' engagement with complex concepts. These efforts could serve to subsequently improve their performance in this area.

Limitations of Results

Sample size. The most significant limitation of this study is associated with the small sample obtained, which both increased the likelihood for a beta-level error and eliminated the possibility of generalizability of the results of the study beyond the confines of this research. With that said, the actual configuration of the obtained sample merits further review. While small, the sample did mirror statewide trends regarding frequency of various least restrictive environment percentages, geographical distribution, and school administrative unit distribution. The sample was also randomized, within the parameters of the disability and grade level of the targeted students. While larger conclusions cannot be made about the results obtained in this study, they do suggest implications for the direction and focus of future, additional research pertaining to standards-based IEPs and student achievement.

Selection sample bias. This study's data request specified that submitted cases were to include randomly sampled students in grade 3 eligible under Specific Learning Disability or Other Health Impairment. Randomization was achieved through the

specification that one of the cases submitted in each disability category must be from a student with a last name beginning with a letter A through M and one of the cases must be from a student with a last name beginning with a letter N through Z. However, save for an explicit request that submitted IEPs be created by different individuals, there were no restrictions placed on the selection of the special educators whose authored IEPs were submitted for this study. Further, it may not have been possible in smaller SAUs to submit materials from different individuals as their staffing structures may have included one special educator per grade level, or school. Additionally, submitted cases may have been subjected to some form of sample selection bias and, as such, may have included IEPs created by special educators who were known by their special education administrators to craft IEPs of higher quality than their peers, or to implement instruction of higher quality than their peers. This potential source of bias introduced a threat to the study's internal validity, as it may have affected the relationship between the independent and dependent variables (Campbell and Stanley, 1963). Much like the concept of gatekeeping bias in the media, in which the media purposefully selects and deselects stories to print, it was impossible to determine the frequency of nonrandom sample selection from an assessment of the IEPs, as this type of bias is considered 'unknowable' (D'Alessio and Allen, 2000).

General Supervision System Monitoring Tool validation. The GSS Monitoring Tool used to assess submitted standards-based IEP compliance with Maine state expectations was also a limiting factor in this study, as the Tool has not been scientifically validated. According to Rubio, Berg-Weger, Tebb, Lee, and Rauch, content validity "refers to the extent to which the items on a measure assess the same content or

how well the content material was sampled in the measure" (2003, p. 94). Experts at the Maine Department of Education created the GSS Monitoring Tool in accordance with state and federal regulatory expectations pertaining to standards-based IEPs, and IEPs in general, therefore the Tool has some measure of content validity. Further, the use of the GSS Monitoring Tool matched the purpose for which it was designed. However, there exist concerns with the Tool's level of construct and concurrent validity due to the absence of statistical measurements pertaining to how well the Tool matches other validated instruments measuring standards-based IEP compliance and to how well the Tool's rankings match other assessments of standards-based IEPs (Beaudry and Miller, 2016). While monitoring tools, and rubrics, have been developed in other states to assess standards-based IEPs for compliance, they do not match the Maine state required IEP format nor are they designed to analyze the specific content Maine's standards-based IEP policy requires (Smith, S., 2016). The field is generally lacking a scientifically validated tool designed to assess Maine IEPs and future efforts to develop said tool are recommended.

Additional variables. This study is also limited by its lack of inclusion of other variables known to affect student achievement. While the most prominent special education variables were included as covariates in the research design, and the sample was structured to reduce variables in grade level, disability, and location, there exist a myriad of other variables deemed influential on student achievement. These variables range from out of school factors such as student race, socio-economic status, mobility, and family structure to in-school factors such as teacher effectiveness, school leadership, and curriculum. In his meta-analysis of 1200 studies, Hattie (2017) found that the

variables most influential on student achievement (those with effect sizes over three times the typical effect size of 0.4) were collective teacher efficacy, self-reported grades, teacher estimates of achievement, cognitive task analysis, response to intervention, Piagetian programs, and the jigsaw method. Further, Hattie (2017) determined the variables most detrimental to student achievement (those with negative effect sizes) were retention, corporal punishment in the home, moving between schools, depression, boredom, deafness, and ADHD. As cited by Stump et al. (2017), in response to questions about proficiency-based diplomas and their association with standards-based IEPs, a state leader cited some of more prominent variables affecting the achievement of students with disabilities:

> Student mobility is believed to be higher in the population of students eligible for special education services than the general population. There are also students [with disabilities] from multiple districts in out-of-district placements or special purpose private schools. Diplomas are awarded by the sending district. If there are multiple districts with different standards, how do they develop a common curriculum for their students and also ensure they can earn a diploma? (p. 22)

However, due to struggles associated with collection of data, this research did not include, or control for those factors. For example, at the initiation of this study, it was assumed the provided NWEA score reports would provide information related to student mobility, because the number of years a student took the NWEA in the targeted school district could be gleaned from the typical NWEA Student Progress Report. However, this assumption proved incorrect - NWEA scores, percentiles, and growth targets are available through a number of different reports in the NWEA platform and special

education administrators did not all utilize the same Student Progress Report to submit their data. It proved impossible to collect, and subsequently integrate, this information into the analysis. Devising a means of collecting data associated with such variables into additional research in this area would serve to further enhance its validity.

Suggestions for Future Research

Maine's Policy on Standards-Based IEP Goals was developed in response to the demands of a society that expected better results from its schools, particularly in regards to the levels of achievement of students with disabilities as indicated by nationwide assessment and accountability measures mandated by NCLB and IDEA. Maine's Policy was further situated in the moral context of society's need to ensure students with disabilities were afforded both equality of access to, and equality of opportunity within, public education. Standards-based IEPs have been viewed as a means by which special educators can boost levels of student achievement in the general education curriculum in the least restrictive environment possible. One special educator noted, as cited in Maine Education Policy Research Institute's 2017 report on the impact of proficiency based diplomas on special education, standards-based IEP implementation is "about finding a balance. It's pushing them as high as they can go but not wanting to create a structure that penalizes them" (Stump, Johnson, and Jacobs, 2017, p. 24). However, beyond improving special education student opportunities and outcomes, policies mandating standards-based IEPs also impacted special educators' abilities to design and implement appropriate individualized programming, levels of student inclusion in the least restrictive environment, and special educator attrition rates. As one special education administrator cited in MEPRI's 2017 report noted

> We cannot ignore the IEP changes that may be necessary; it's the law. What is required in an IEP does not necessarily match up easily with this new system. That's a real strain on our resources in terms of the time- intensive nature of writing and reviewing IEPs. (Stump, Johnson, and Jacobs, 2017, p. 24)

Standards-based IEPs, therefore, demanded increased effort, attention to detail, and familiarity with multiple content standards; as such, assessing and understanding the 'return on investment' in this area is important. Writing high quality standards-based IEPs takes significant practice, collaboration with regular educators, and considerable thought (Konrad et al., 2014). Given these extensive impacts, there is an essential need for empirical research designed to assess the presence, and associated significance of, the impact of Maine state compliant standards-based IEPs on the achievement of students with disabilities.

Research study design. While this study was designed to address this empirical research gap in its investigation of the significance of the impact of Maine standards-based IEP compliance on the achievement of students with high-incidence disabilities, the difficulty with obtaining a generalizable sample size prevented the larger application of the results. With that said, the results do hint at the potential for additional studies to positively impact future policy decisions in this area. First and foremost, future research designs must focus on obtaining a larger number of cases from targeted SAUs to build the sample size to generalizable numbers so that conclusions will have larger implications for the target population of students with disabilities. Future studies must incorporate and accommodate for other factors that influence student achievement. Studies that involve direct review of student IEPs must further account for the variability in level of student

academic needs, as some students eligible under high-incidence disability categories present with needs that are functional, and not academic, in nature. Compliance measures designed to score IEPs based on the presence or absence of academic goals must differentiate in some way for between those IEPs that fail to include academic goals, and those IEPs that do not require them at all.

IEP compliance rating tool. Future research specific to Maine should address the need to create a scientifically validated tool specifically designed to measure compliance of standards-based IEPs. While this study's compliance measure was used in the manner for which it was designed, it was not scientifically validated and it did not assess all components of standards-based IEPs with a high degree of specificity. Strategies suggested by Cathcart et al.'s (2009) seven steps for developing standards-based goals or Rudebusch's (2012) tutorial on developing standards-based IEPs, may prove to be beneficial to this research. In order to more accurately assess standards-based IEP quality, and to provide educators with targeted feedback designed to foster growth in their abilities to design and implement standards-based IEPs, a newly devised, scientifically validated measurement tool must be created.

Factors influencing student achievement. Additional research is also needed to determine and measure variables that exert the most influence on the achievement of students with disabilities. This study's research design controlled for the variables of least restrictive environment and disability, kept student grade constant, and recognized its failure to incorporate the variable of the effects of student longevity in a school system. However, the design did not include variables that may have impacted student performance in one content area as compared to another or other variables known to

impact student achievement. As noted by Hanushek, Kain, and Rivkin (2002), there is great difficulty in identifying the causal effects of special education programs because special education students differ significantly and, as such, achievement differences commingle program effects with other factors. Results of this study provide some insight into those factors that specifically influence the achievement of students with disabilities, some of which merit further exploration.

Least Restrictive Environment. In accordance with IDEA, Maine's Unified Special Education Regulations (MUSER) (2017) define least restrictive environment for children with disabilities three to twenty as:

> To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, shall be educated with children who are not disabled, and special classes, separate schooling, or other removal of students with disabilities from the regular educational environment shall occur 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 . (p. 120)

Maine's IEP Team-determined placements fall within three general LRE categories. The first category is *special education outside the regular classroom less than 21 percent of the school day*, which refers to programs for children with disabilities who are placed in the regular education setting and receive their services in said placement, and to programs for children with disabilities who are placed in the regular class and receive a minimal amount of services outside regular classes (MUSER, 2017, p. 122). The second category is *special education inside the regular class no more than 79 percent of the day and no*

less than 40 percent of the day, which refers to programs for children with disabilities who receive their services in resource rooms, and to programs for children with disabilities who receive their services in resources rooms in conjunction with part-time instruction in the regular class (MUSER, 2017, p. 123). The third category is *special education inside the regular class for less than 40 percent of the school day*, which refers to programs for children with disabilities who are placed in self-contained classrooms with part-time instruction in the regular class, programs for children with disabilities who are placed in self-contained classrooms with full time special education instruction, and to programs for children with disabilities who receive tutoring services (MUSER, 2017, p. 123). Typically, children with higher levels of academic and/or functional needs are removed from the regular education setting more frequently and thus participate in programs associated with lower least restrictive environment percentages.

Low least restrictive environment percentages and self-contained programming are typically associated with students with low incidence disabilities, such as autism, deaf blindness, emotional disturbance or intellectual disability, because the severity of many of the manifestations of these disabilities prevent the student from receiving an appropriate education in the general education setting (Rozalski, Stewart, and Miller, 2010). Furthermore, Morningstar, Kurth, and Johnson (2017) determined overall access to the general education setting is generally lacking for this group of students. There is an opposite trend for students with high incidence disabilities, such as Other Health Impairment and Specific Learning Disability. McLeskey, Landers, Williamson, and Hoppey (2012) investigated least restrictive environment data collected by the United States Department of Education's Office of Special Education Programs from 1990-2008

and found a 93% increase of students with high incidence disabilities during that time period whose least restrictive environment percentages were 80% or more. The data on national least restrictive environment percentages examined by McLeskey et al. further indicated that, in 2007, students with specific learning disabilities with least restrictive environment percentages of 80% or higher accounted for 28.88% of all students with disabilities, and students with other health impairments with least restrictive environment percentages of 80% or higher accounted for 7.17% of all students with disabilities. Save for the data associated with students with speech or language impairments, students in these two categories represented the majority of students with disabilities who had least restrictive environment percentages of 80% or higher and, therefore, most frequently accessed the general education setting. The sample for this study reflects this trend; the majority of selected cases were associated with children with disabilities whose least restrictive environment percentages were greater than 80% of the school day, thereby indicating that they had considerable access to the general education setting.

There are, however, contrasting perspectives about the value of student access to the general education environment. The findings of Morningstar et al. (2017) challenged the perspective that general education settings offer instructional and social advantages over special education settings, and the perspective that specially designed instruction should occur in more restrictive settings. Future research should be conducted regarding the connection between least restrictive environment percentage and the achievement of students with disabilities in order to determine if this variable is significantly influential on student achievement.

Variance in special educator instructional capacities. Future research should also explore the connection between special educator instructional abilities in math and in reading, respectively, and the achievement of students with disabilities. It is possible, though unproven, that standards-based IEP compliance ratings may have significantly impacted student achievement in reading, but not significantly impacted student achievement in math, because of the variance in special educator capacities.

Maine integrated the Common Core State Standards into the Maine Learning Results in 2011 and since that time schools have been required to align their curricula, instruction and assessments to these standards. The standards to which Maine's Policy on Standards-Based IEP Goals refers, therefore, are the Common Core State Standards for general education instruction in Mathematics and English/Language Arts. The math standards consist of hundreds of domains, clusters, and standards partitioned by grade level. They differ from previously adopted state standards due to their emphasis on higher level thinking and conceptualization over memorization and procedures (Powell, Fuchs, and Fuchs, 2013).

Given this reality, teachers must continuously work in an environment of increasing demands and limited time to understand the standards, and provide aligned, instruction that simultaneously addresses each student's math conceptual and foundational skill needs (Powell et al., 2013). To deliver proper literacy programming aligned with the Common Core State Standards to students with disabilities, "teachers are also advised to have a thorough understanding of grade-level expectations and curriculum to adapt appropriately" (Van Boxtel, 2017, p. 57). Leko, Brownell, Sindelar, and Kiely (2015) opine that for students with disabilities to succeed in general education curricula

driven by the CCSS, special educators must have extensive knowledge of how to support their students in achieving rigorous content standards by becoming extremely proficient in associated content, interventions, assessments, and technology. The Council of Chief State School Officers (2012) perhaps articulated this concept best when they stated that, in accordance with the CCSS, "higher expectations for students have led to higher expectations for teaching" (p. 27).

In the field of special education, as Browder et al. (2006) discovered in their study of aligning instruction with state content standards, it is essential for educators, and IEP teams, to become fluent with both national and state content area standards, at each student's grade level, in order to properly plan individualized education programs for their students. However, it is sometimes easy for special educators to misunderstand the general education content, or intent of the standards, due to their long history of teaching alternative curricula, and to their need to master a plethora of standards in numerous content areas (Browder et. al., 2006). Van Boxtel (2017) designed a mixed methods study of purposively sampled California special education administrators to analyze their perceptions of what is important for special educators to know about the CCSS. Van Boxtel (2017) found that, while there was a general perception that special educators need to build comprehensive CCSS expertise, special educators were generally receiving more standards-focused professional development in ELA than in math. Special education administrators also recognized a real need for more sophisticated mathematics instruction and deeper understanding of the standards for students with disabilities, as evidenced by one administrator's statement about the need for professional development focused on "re-tooling of our methodology for how math is taught" because "many

teachers are struggling with the content" (p. 57+). Van Boxtel (2017) concluded that, in general, math content mastery and CCSS-aligned math instruction are lacking for current special education teachers.

While the standards themselves are relatively easy to access and integrate into student IEPs as evidenced by this study's high levels of IEP compliance in the standard-based goal section of the GSS Monitoring Tool, the complexities of selecting the appropriate standards, and of designing instruction to support student mastery of those standards, create a disconnect between standards-based IEPs and the quality of the programming they are designed to promote. The overall effectiveness of an IEP, as measured by its ability to promote student progress and achievement, depends intimately on how well the goals and objectives meet the needs of the student (Konrad et al., 2014). Special educators may possess more knowledge pertaining to standards, appropriate instruction, and accurate assessment of student needs in literacy, which enables them to create compliant standards-aligned IEPs in this domain. The discrepancies in special educators' capacities to create standards aligned math programs indicate the need for further research in this area, particularly regarding how these differential educator capacities may affect student achievement.

Interrelationship of reading and math achievement. Students eligible for special education services under the high incidence categories of Specific Learning Disability and Other Health Impairment demonstrate different manifestations of their disabilities throughout their educational performance. In accordance with section 34 CFR 300.8(c)(10) of IDEA, MUSER (2017) defines a Specific Learning Disability as

> a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. (p. 84)

and in accordance with section 34 CFR 300.8(c)(9) of IDEA, MUSER (2017) defines an Other Health Impairment as

> having limited strength, vitality or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that is due to chronic or acute health problems and adversely affects the child's educational performance. (p. 81).

MUSER further states individuals eligible under this category must demonstrate a need for special education and related services in the areas of academic performance, functional performance, or both. A student's performance in literacy and/or mathematics may be affected in different ways by his or her Other Health Impairment or Specific Learning Disability.

Often, student struggles in literacy directly translate to student struggles in mathematics due to an inability to access content and engage in problem solving techniques. Abedi and Lord (2001) concluded numerous studies' findings of "discrepancies between performance on verbal and numeric format problems strongly suggests that factors other than mathematical skill contribute to success in solving word problems" (p. 220). In their study of the mathematics profiles of students with various

learning disabilities, Fuchs and Fuchs (2002) discovered that the functional and cognitive profiles of children with mathematical learning disabilities, with and without comorbid reading disabilities, may differ, particularly as evidenced by Aiken's (1972) correlations between reading comprehension and problem solving of .40 to .86. Similarly, in their study of the academic and educational outcomes of children with ADHD, which represents one of the most common conditions associated with eligibility under Other Health Impairment, Loe and Feldman (2007) found children with ADHD typically scored lower in both math and reading than those in control groups. This finding is corroborated by Purvis and Tannock's (1996) findings that a substantial proportion of children with ADHD also meet the criteria for a diagnosis of reading disability and demonstrate academic challenges associated executive functioning deficiencies.

Student performance in math may be further depressed by student struggles in reading. Abedi and Lord's (2001) found linguistic modifications of NAEP math test items resulted in significant differences in math performance of ELL, SES, and ability grouped students. They determined the largest discrepancy in improvement was found in students in different math classes. Those students in the lowest classes, the population of which included students with disabilities, demonstrated the highest percentage in score improvement when problems were made more linguistically accessible. Literacy skills are, in fact, predictors of math performance (Abedi and Lord, 2002). As such, the effects a student's literacy skills have on his or her performance in math may be considerable, and future research should explore the significance of a student's disability profile on his or her literacy and math achievement.

Beyond the potential variables of least restrictive environment, special educator instructional capacity, and the inter-relationship of math and literacy achievement, a multitude of other variables significantly influence student achievement. In his most recent meta-analysis, John Hattie (2017) found that collective teacher efficacy, self-reported grades, teacher estimates of achievement, cognitive task analysis, response to intervention, and Piagetian programs had the greatest impacts on the achievement of all students and the variables of teacher quality, school leadership, student ethnicity, student socioeconomic status, student social-emotional functioning, and student gender impact achievement to a somewhat lesser degree. Hattie (2017) identified 252 different influences on student achievement. Future studies designed to investigate the impact of standards-based IEPs on the achievement of students with disabilities should, therefore, consider and measure additional variables known to significantly affect student performance.

Conclusion

The continued under-achievement of students with disabilities is cause for widespread concern, particularly in view of special education's increasing, oftentimes disproportionate, fiscal impacts on local, state, and national budgets. In fact, as noted by Hanushek et al. (2002), expenditures for students with identified disabilities average more than twice those for students without disabilities. While some data, such as state assessment results and nationally representative study results cited by McLaughlin (2006), indicate students with disabilities' graduation rates and performance on standardized assessments are both improving, there still exists a significant difference in the achievement levels of students with disabilities as compared to their regular education

peers. These factors have led to increased public and political attention to the realm of special education, as stakeholders seek evidence of 'return on their investments.' Although discussion of the moral purpose of special education is not necessarily relevant here, claims regarding the many, varied benefits of special education do little to counter demands for results in terms of student performance. Efforts, such as the standards-based IEP movement, designed to improve achievement levels of students with disabilities in the face of increasing public scrutiny and accountability measures, merit investigation both in terms of their efficacy and viability.

The primary purpose of this quantitative study, therefore, was to understand the presence, and significance of impact of an IEP's compliance with Maine state standards-based IEP expectations on student achievement in math and reading, as measured by a student's growth target percentage on the NWEA's Measures of Academic Progress assessment. Although the study suffers from a small sample size, and non-generalizable results, the minimal, or lack of impact of standards-based IEP compliance on the achievement of students with disabilities in this sample have contributed to an increased understanding of the complexities associated with IEP construction, as well as those associated with assessing the achievement of students with disabilities.

Standards-based IEPs have been promoted as an essential component of improved outcomes for students with disabilities. Walsh (2001) emphasized this perspective in his review of IEP goals and state standards, noting

> the strengthening of the IEP process 'as a formal mechanism for deciding how individual students with disabilities will participate in standard-based reform' ... (McDonnell et al., 1997, p. 9), is critical to the successful provision of appropriate

> special education services to students with disabilities... and to the performance of individual students. (p. 20)

However, given the results of this study, educators and policymakers alike should pause in their advancement of standards-based IEPs as a significant means to improve the math and reading achievement of students with disabilities. By introducing doubt into this claim for the students, the study's results illuminate the need for additional investigation in regards to the impact of standards-based IEPs on the achievement of students with disabilities. Only through a review of the findings of such empirical research will stakeholders be able to determine what components, if any, of standards-based IEPs positively impact student achievement, and to subsequently identify the best path forward in terms of special education policies and practice. Our students deserve nothing less.

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Appendix A

NOTICE OF EVALUATION-EXEMPT

DATE:	June 19, 2018
TO:	Jessica Yates, Educational Leadership Catherine Fallona, Literacy Education
FROM:	Rachel Kasperek, USM IRB
PROTOCOL TITLE:	An Examination of the Relationship Between the Achievement of Students with High Incidence Disabilities and Maine State Compliant Standards-Based Individualized Educational Programs
FUNDING SOURCE:	
PROTOCOL NUMBER:	18-05-1092 Approval Date: June 19, 2018

The Office of Research Integrity and Outreach (ORIO) has evaluated the project named above. This study has been granted an exemption from USM IRB review per Title 45 CFR Part 46. This designation is based on the assumption that the materials that you submitted to the IRB contain a complete and accurate description of all the ways in which human subjects are involved in your research.

This exemption is given with the following terms:

1. You will conduct the project according to the plans and protocol you submitted;
2. No further contact with the ORIO is necessary unless you make changes to your project or adverse events or injuries to subjects occur;
3. If you propose to make any changes to the project, you must submit the changes to the ORIO for review; you will not initiate any changes until they have been reviewed and approved by the ORIO;
4. If any adverse events or injuries to subjects occur, you will report these immediately to the ORIO;
5. As applicable, you will comply with the University of Maine Information Security Policy and Standards and/or the Muskie School of Public Service Securing Protected Information Policies and Procedures and any other applicable USM policies or procedures; and
6. You will close the project upon completion (or discontinuation).

The University appreciates your efforts to conduct research in compliance with the federal regulations that have been established to ensure the protection of human subjects in research.

Sincerely,

Rachel Kasperek

Appendix B

Correspondence to Potential Participants to Request Data

My name is Jess Yates, and I am currently a PhD candidate at the University of Southern Maine. My dissertation research is focused on examining the impact of standards-based IEPs on student achievement in math and reading.

In order to conduct this IRB approved study, I need to collect, at minimum, *269* IEPs for students with Specific Learning Disabilities or Other Health Impairments in Grade 3, as well as those same students' most recent Northwest Evaluation Association (NWEA) assessment Student Progress Reports. Data gleaned from these documents will be entered into the statistical analysis software, SPSS, and analyzed using an Analysis of Covariance. School districts will not be identified, as the data will be used in aggregate form as representative of the specified population of students throughout Maine.

All data must be de-identified prior to submission in order to maintain student anonymity, and to meet requirements for FERPA and confidentiality. Submitted data will be stored in physically and/or electronically secure locations, accessible only to the researcher, and will be maintained at this level of security for three years after the completion of the study.

I am requesting that special education administrators from SAUs across Maine collect and submit the following de-identified materials for 4 different students:

Case:	WHAT to collect:	FOR what type of student:
Student 1	1.Most Recent IEP 2. Most Recent NWEA Student Progress Report	Student Profile: 3rd grade Last name begins with a letter between A through M Eligible under Specific Learning Disability
Student 2	1.Most Recent IEP 2. Most Recent NWEA Student Progress Report	Student Profile: 3rd grade Last name begins with a letter between N through Z Eligible under Specific Learning Disability

Student 3	1.Most Recent IEP 2. Most Recent NWEA Student Progress Report	Student Profile: 3rd grade Last name begins with a letter between A through M Eligible under Other Health Impairment
Student 4	1.Most Recent IEP 2. Most Recent NWEA Student Progress Report	Student Profile: 3rd grade Last name begins with a letter between N through Z Eligible under Other Health Impairment

If possible, please submit IEPs created by different case managers.

De-identification of data, according to FERPA, refers to the process of removing or obscuring any personally identifiable information from student records to minimize or eliminate the risk of unauthorized disclosure of student identities. This means ALL identifiable student data such as:

- identification numbers,
- names,
- addresses,
- telephone numbers, and
- birthdates

must be obscured/removed before the documents are provided to the researcher. The most effective method for de-identification is accomplished by electronically deleting the above listed information from the document. (Please double check to ensure identifying information is removed from EVERY section and page of the IEP, including the headers, and from the header of the NWEA Score Report!)

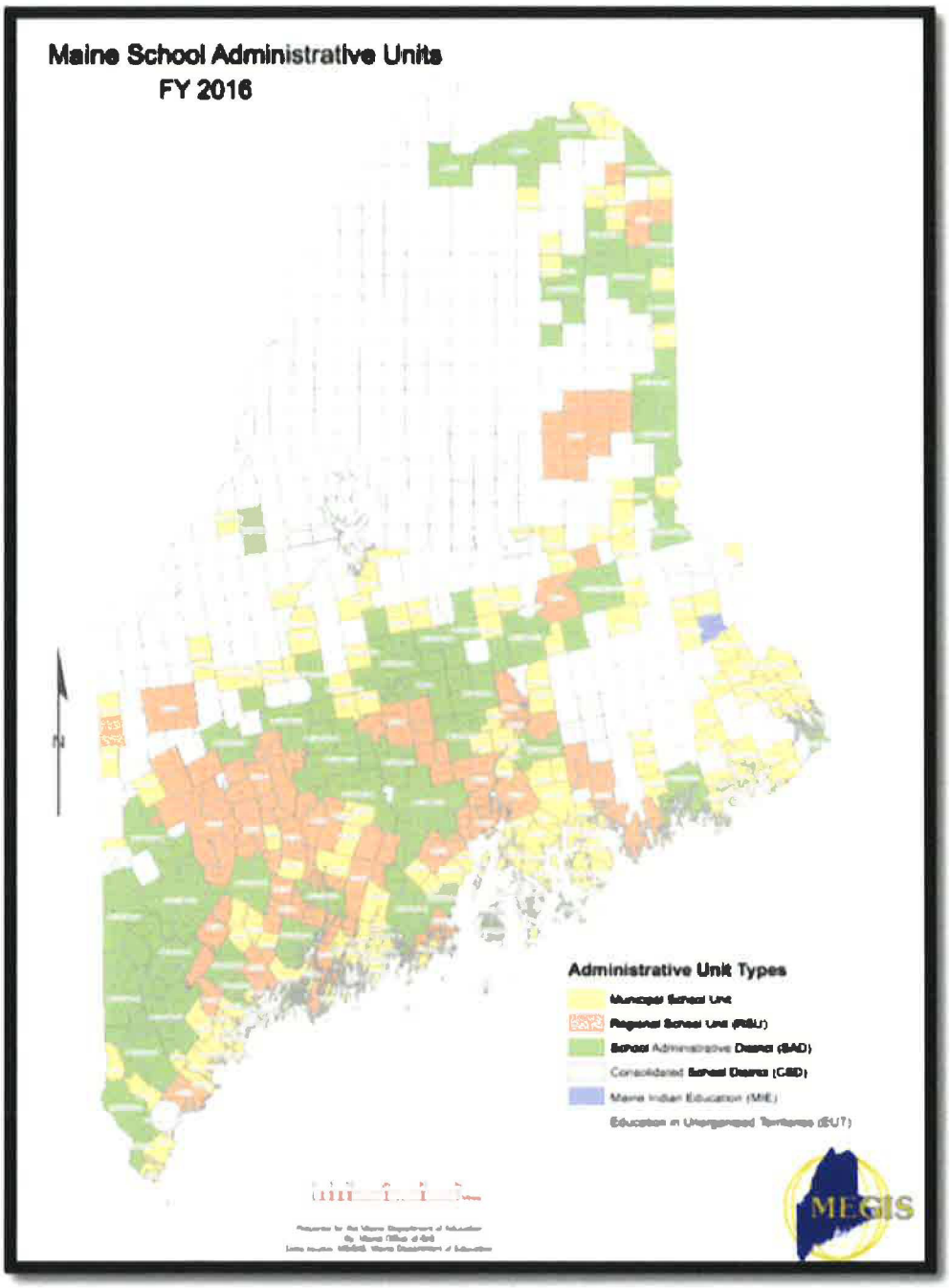
If you are willing to provide the above listed data for this study, or have any additional questions, please contact me at (207) 315-0545 or by email at jessica.yates@maine.edu. Documents can easily be emailed as attachments to me. If sending them via regular mail is preferred, please let me know and I can either provide

a self-addressed stamped mailer for your use, or come to your location to pick up requested materials. *Please plan to submit all documents by August 30, 2018.*
The results of this study are of interest to all of Maine's special educators in view of their potential implications for current policies on standards-based IEP practices, and will be available in the University of Southern Maine's Digital Commons upon the successful completion of my dissertation.

Thanks in advance for your help!

Appendix C

Maine School Administrative Units, FY 2017



Data Source: Maine Department of Education

Appendix D

Subset of Maine Department of Education General Supervision System Public School Monitoring Tool (Updated May 2016)

IEP Process: Academic Performance				
	Item	**Citation**	**Criteria**	**Corrective Activities**
APG1 Section#4 A	**Results of initial or most recent academic evaluation of the child.**	**34 CFR 300.324(a)(1)(iii)** **MUSER IX.3.C(1)(c)**	**Yes = The date, evaluation type, and the results are current with most recently completed academic evaluations being considered when developing the child's IEP.** **No = Evaluation information is incomplete, or academic evaluations have not been updated or completed or were not considered.** **N/A= There is documentation in the WN that the IEP Team determined new academic evaluations were not necessary to determine continuing eligibility based on the severity of the child's disability.**	**Child level:** **Corrective activity:** **IEP Team meets to consider most recent academic evaluations or to discuss further evaluations that may need to be conducted and (if appropriate) amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP meeting protocol, including reviewing and discussing evaluations and reevaluations.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's for review of discussion of recent academic evaluations.**

APG2 Section #4A	**Academic strengths of the child.**	**34 CFR 300.324(a)(1)(i)** **MUSER IX.3.C(1)(a)**	**Yes = The IEP includes the child's academic areas of strength that act as the pathway to the general education curriculum** **No = The IEP does not include the child's academic areas of strength that act as the pathway to the general education curriculum in performance, achievement or both, relative to age, State approved grade level standards or intellectual development.** **N/A= No academic needs.**	**Child level:** **Corrective activity:** **IEP Team meets to discuss the academic strengths of the child and amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP meeting protocol, including reviewing academic strengths of the child.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's for review of academic strengths of the child.**
APG3 Section #4A	**Academic needs of the child.**	**MUSER IX.3.C(1)(d)**	**Yes = The IEP includes the statement of academic needs and address how the student is doing in the content area curriculum.** **No = Incomplete statement of academic needs of the child.** **N/A= No academic needs.**	**Child level:** **Corrective activity:** **IEP Team meets to discuss the academic needs of the child and (if appropriate) amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP meeting protocol, including reviewing academic needs of the child.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and section #4A of 5 IEPs (amended or new) and**

				WN's for review of needs of the child.
APG4 Section #4A	**A statement of child's present levels of academic achievement, including how the child's disability affects the child's involvement and progress in the general education curriculum.**	**34 CFR 300.320(a)(1)(i)** **MUSER IX.3.A(1)(a)(i)**	**Yes = A statement of the child's present levels of academic achievement and how the child's disability affects the child's involvement and progress in the general educational curriculum.** **No = A statement of the child's present level of academic achievement is NOT developed in the IEP, and/or may be incomplete.**	**Child level:** **Corrective activity:** **Discuss the child's present levels of academic achievement based on strengths and needs of the child, including how the child's disability affects involvement and progress in general curriculum and amend IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP development including writing the present levels of academic performance.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) with academic present level statements and WNs.**
Standards Based Goals				
#	**Item**	**Citation**	**Criteria**	**Corrective Activities**

SBG1 Section #4A	**IEP includes academic goals aligned with the student's needs and present level of academic performance, and designed to facilitate the student's achievement of grade level (or grade span) Maine Learning Results.**	**34 CFR 300.320 (a)(2i)(A), MUSER IX (3)(b)(i)**	**Yes = Goals adequately address needs and align with present level statement relative to Maine Learning Results.** **No = Goals do not adequately address needs and present level statement and/or are not based on Maine Learning results.** **N/A= No academic goal needed.**	**Child level:** **Corrective activity:** **IEP Team meets (if appropriate) to consider the most recent data, needs, present level, and write academic goals aligned with Maine Learning Results; amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP goals aligned with state standards.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's for review of goal alignment for the child.**
SBG2 Section #4A	**IEP academic goals are formatted by: (what date), given(conditions), student will(do what observable behavior), as measured by(assessment or other)**	**34 CFR 300.320 (a)(2i)(A), MUSER IX (3)(b)(iii)**	**Yes = Goals include all components.** **No = Goals do not include necessary components.** **N/A= No academic goal needed.**	**Child level:** **Corrective activity:** **IEP Team meets to discuss academic goal format aligned with State standards (if appropriate) amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP goal writing protocol, including reviewing academic present level, strengths and needs of the child.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's for format of goals.**

SBG3 Section #4A	**IEP academic goals are measurable (include data or activities to be measured by score, percent, frequency, or specific demonstration of mastery).**	**MUSER IX (3)(c)**	**Yes = Goals give all information necessary for measurement.** **No = No baseline data, no outcome, or no other measure of growth included in goals.** **N/A= No academic goal needed.**	**Child level:** **Corrective activity:** **IEP Team meets (if appropriate) to discuss the measurement of academic goals aligned with State standards and amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP aligned goals meeting goal writing protocol, including reviewing present level, strengths and needs.** **Evidence:** **Submit outline of training and attendance.** **Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's for review goal measurability.**
SBG4 Section #4A	**IEP academic goals have a citation linking them to the grade level (or grade span) general education curriculum standards.**	**34 CFR 300.320 (a)(2i)(A)** **MUSER IX (3)(b)(i)and (iii)**	**Yes = Goals include grade level citation.** **No = Goals do not include citation** **N/A= No academic goal needed.**	**Child level:** **Corrective activity:** **IEP Team meets (if appropriate) to discuss the citation of academic goals aligned with State standards and amend the IEP.** **Evidence:** **Submit child's WN and amended IEP.** **SAU level:** **Corrective activity:** **Provide training on IEP meeting citation protocol of standards aligned goals.** **Evidence:** **Submit outline of training and attendance.**

				Submit 1st page and Section #4A of 5 IEPs (amended or new) and WN's goal citation.

Academic Section			
#	**Item**	**Criteria**	**Rating**
APG2 Section #6A	**Academic strengths of the child.**	**Yes = The IEP includes the child's academic areas of strength that act as the pathway to the general education curriculum No = The IEP does not include the child's academic areas of strength that act as the pathway to the general education curriculum in performance, achievement or both, relative to age, State approved grade level standards or intellectual development. N/A= No academic needs.**	
APG3 Section #6A	**Academic needs of the child.**	**Yes = The IEP includes the statement of academic needs and address how the student is doing in the content area curriculum. No = Incomplete statement of academic needs of the child. N/A= No academic needs.**	
APG4 Section #6A	**A statement of child's present levels of academic achievement, including how the child's disability affects the child's involvement and progress in the general education curriculum.**	**Yes = A statement of the child's present levels of academic achievement and how the child's disability affects the child's involvement and progress in the general educational curriculum. No = A statement of the child's present level of academic achievement is NOT developed in the IEP, and/or may be incomplete.**	
		Count of "Yes" Performance Indicators	
Standards Based Goals Section			

#	Item	Criteria	Rating
SBG1 Section #6A	**IEP includes academic goals aligned with the student's needs and present level of academic performance, and designed to facilitate the student's achievement of grade level (or grade span) Maine Learning Results.**	**Yes = Goals adequately address needs and align with present level statement relative to Maine Learning Results. No = Goals do not adequately address needs and present level statement and/or are not based on Maine Learning results. N/A= No academic goal needed.**	
SBG2 Section #6A	**IEP academic goals are formatted by: (what date), given(conditions), student will(do what observable behavior), as measured by(assessment or other)**	**Yes = Goals include all components. No = Goals do not include necessary components. N/A= No academic goal needed.**	
SBG3 Section #6A	**IEP academic goals are measurable (include data or activities to be measured by score, percent, frequency, or specific demonstration of mastery).**	**Yes = Goals give all information necessary for measurement. No = No baseline data, no outcome, or no other measure of growth included in goals. N/A= No academic goal needed.**	
SBG4 Section #6A	**IEP academic goals have a citation linking them to the grade level (or grade span) general education curriculum standards.**	**Yes = Goals include grade level citation. No = Goals do not include citation N/A= No academic goal needed.**	
		Count of "Yes" Performance Indicators	

Appendix E

Standards-Based IEP Compliance Stage Rubric

IEP Code:		Disability:	
Grade Level:		Rater:	

Standards-Based IEP Compliance Scale		
Subcategory: Academic Performance		**IEP Rating**
Score 4	All three Academic Performance indicators are "Yes."	
Score 3	Two out of four Academic Performance indicators are "Yes."	
Score 2	One out of four Academic Performance indicators are "Yes."	
Score 1	Zero out of four Academic Performance indicators are "Yes."	
Subcategory: Standards-Based Goals		**IEP Rating**
Score 4	All four Standards-Based Goal indicators are "Yes."	
Score 3	Three out of four Academic Performance indicators are "Yes."	
Score 2	Two out of four Academic Performance indicators are "Yes."	
Score 1	Zero - One out of four Academic Performance indicators are "Yes."	
	Overall Rating (average)	

Standards-Based IEP Compliance Stage
Overall Rating

1 Emerging Stage (0-24% compliant)	2 Progressing Stage (25-50% compliant)	3 Partial Mastery Stage (51-75% compliant)	4 Mastery Stage (76-100% compliant)
Score Range: 0.0-1.0	Score Range: 1.1-2.0	Score Range: 2.1-3.0	Score Range: 3.1-4.0