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A STUDY OF THE EFFECTIVENESS OF THE EQUALS MATHEMATICS
CURRICULUM AND TEACHER PERCEPTIONS OF AND ATTITUDES ABOUT
THE CURRICULUM

by

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A dissertation submitted in partial fulfillment of the requirements
for the Degree of Doctor in Education
in the School of Teaching, Learning, & Leadership
in the College of Education
at the University of Central Florida
Orlando, Florida

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2013

Major Professor: Kenneth T. Murray

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ABSTRACT

The purpose of this study was to determine if the use of the Equals mathematics curriculum had any statistically significant impact on the 2012 Florida Alternate Assessment mathematics scores of students with disabilities in six Florida school districts when comparing the scores of those who received mathematics instruction via the curriculum to the scores of students with disabilities in six other Florida school districts who did not receive mathematics instruction via the curriculum. This study further examined the perceptions of and attitudes about the Equals mathematics curriculum that exist among Exceptional Student Education (ESE) teachers who teach mathematics to students with disabilities participating in the Florida Alternate Assessment (FAA).

The study utilized a mixed methods approach to research that included both quantitative and qualitative methodologies. The quantitative portion of the study was conducted using archival data obtained from the 2012 Florida Alternate Assessment Data Book. A Mann-Whitney U Test was conducted through SPSS at a significance level of $\alpha = .05$ to test for relative differences in performance between the treatment (Equals) and control (non-Equals) groups. Based on the results, the Equals mathematics curriculum did not have any statistically significant impact on the 2012 FAA mathematics scores for students with disabilities in the treatment school districts at any of the tested grade groupings (elementary, middle, high, and overall).

The qualitative method of data collection utilized an online teacher survey. The results were analyzed using the researcher-coded results and assisted through summary

tables provided by Survey-Monkey. Differences and similarities among the survey question responses were explored. Common terms and themes were noted and compared. Data triangulation was used by surveying teachers from five of the six treatment counties. This promoted generalizability for study replication since the treatment counties train teachers and utilize the curriculum in different manners. The results of the qualitative analysis indicated that many teachers were not satisfied with the training they received and felt overwhelmed by the curriculum itself, specifically in the areas of lesson planning and delivery. Based on the quantitative and qualitative results, it was concluded that further research needs to be completed to determine the effectiveness of the Equals mathematics curriculum when used with true fidelity.

This study is dedicated to my daughter, Dakotah, who is a student with both physical and cognitive disabilities. It is also dedicated to all the ESE students whom I have taught and whose lives I may have affected or will affect in the future.

ACKNOWLEDGMENTS

I would like to first thank my son, Nathan, for helping make this possible. I love him immensely. If it weren't for him babysitting his sister, this wouldn't have been possible because I wouldn't have been able to attend classes. I would also like to thank my dear friends who stepped up to help babysit in many times of need. I feel compelled to acknowledge the compassionate and understanding professors I have had throughout this program. These professors have had high expectations of me but at the same time have had empathy for my life as a single mother of a child with multiple disabilities. I especially want to thank my committee chair, Dr. Kenneth Murray, for understanding my situation and its challenges and working with me throughout this journey. Finally I want to thank my best friend of over 25 years, Heather, for the many nights on my couch helping me with data, listening to me read my paper (over and over), practice my defense too many times to count and saving me with Italian ices on those long and many times late nights.

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LIST OF ACRONYMS/ABBREVIATIONS

AA	Alternate Assessment
AAS	Alternate Achievement Standards
AYP	Adequate Yearly Progress
CBM	Curriculum Based Measurement
CCS	Common Core Standards
ESE	Exceptional Student Education
ESEA	Elementary and Secondary Education Act
FAA	Florida Alternate Assessment
FAPE	Free and Appropriate Education
FCAT	Florida Comprehensive Assessment Test
IASA	Improving America's School's Act
IDEA	Individuals with Disabilities Act
IDEIA	Individuals with Disabilities Education Improvement Act
IEP	Individual Education Program
LEA	Local Education Agency
LRE	Least Restrictive Environment
NCLB	No Child Left Behind Act
NGSSS	Next Generation Sunshine State Standard
USDOE	United States Department of Education
WAAS	Washington Alternate Assessment System

CHAPTER 1 INTRODUCTION

In the mid-1980s, there was a national call for change in education drawing the public's attention to the need for increased accountability for outcomes in education and attention to school quality. This began the wave of education reform initiatives that United States schools are still experiencing (Zatta & Pullin, 2004). Browder et al. (2003) noted that by the mid-1990s, the National Center on Educational Outcomes brought attention to the nation the significantly large number of students with disabilities that were being excluded from accountability systems, including state assessments. The concern highlighted that if these students were excluded from states' accountability systems, they would be excluded from policy decisions. Early alternate assessment authors believed that these assessments would result in students with disabilities being included in local and state reform programs as well as improve instruction in special education.

The Individuals with Disabilities Education Act (IDEA) amendment in 1997 mandated that students with disabilities be included in state assessment programs. This educational reform centered upon allowing appropriate accommodations to students taking the general education tests and creating alternate assessments for students who were still unable to participate in general education tests with accommodations (Denbroeder, n.d.; Karnoven & Huynh, 2007; Zatta & Pullin, 2004). The 1997 amendments of IDEA mandated that students with disabilities be included in district-wide assessments that would also include alternate assessments. According to

Quenemoen (2008), this amendment gave a new definition to what students with disabilities should be able to do and what they should know. In 2004, the Individuals with Disabilities Education Improvement Act (IDEIA) was amended to include the requirement that students with disabilities are to have access to the general education academic standards and curricula. This change allows students in this population to receive instruction that provides them with more opportunities to make progress toward district and state academic standards. There are several research questions that can be explored when examining the effects of the No Child Left Behind Act (NCLB, 2001) on students with significant cognitive disabilities.

Statement of Problem

The No Child Left Behind Act mandates that students with significant cognitive disabilities must be assessed; their assessment scores are to be calculated into school grades and schools' adequate yearly progress (AYP). It also mandates that students with significant cognitive disabilities be proficient in reading and mathematics by 2014. These mandates caused special education programs to create or purchase curricula that would assist teachers in helping students reach proficiency. For students with significant cognitive disabilities, this mandate created educational programs and curricula for students that seemed to move away from functional skills to more academic skills. This shift can potentially have an effect on students' alternate assessment scores in the core content areas, specifically mathematics.

Beginning with the 2011-2012 school year, Central Florida School District A implemented a mathematics curriculum with students who participate in the Florida Alternate Assessment in an effort to meet the rigorous academic requirements of NCLB. There is little research that has been conducted to determine the effectiveness of the Equals curriculum. There are five other Florida school districts known to possess this same mathematics curriculum to be utilized with students who participate in the Florida Alternate Assessment (East Coast Florida School District B and Central Florida School Districts C, D, E, and F). It was unknown if this curriculum had any effect on the mathematics performance of students with significant cognitive disabilities as assessed by the Florida Alternate Assessment.

Purpose of the Study

The purpose of this study was to determine if the use of the Equals mathematics curriculum made a statistically significant difference on the 2012 Florida Alternate Assessment mathematics scores of students with disabilities who received this curriculum as compared to the scores of those students with disabilities who did not receive the curriculum. Specifically, students with disabilities in Central Florida School Districts A, C, D, E, F and East Coast Florida School District B received mathematics instruction via the Equals mathematics curriculum, while students with disabilities in North Florida School District G, South Florida School District H, East Coast Florida School District I, and Central Florida School Districts J, K, and L did not receive mathematics instruction via this curriculum. This study specifically examined the affect, if any, of the Equals

curriculum on the number of students with disabilities scoring Level 4 or higher (showing proficiency).

This study further examined the perceptions of and attitudes about the Equals mathematics curriculum that exist among Exceptional Student Education (ESE) teachers who teach mathematics to students with disabilities participating in the Florida Alternate Assessment. The results of this study will allow Central Florida School District A, as well as other Florida school districts, to determine what benefits, if any, exist in the continuation or adaptation of this specific mathematics curriculum.

Definition of Terms

Adequate Yearly Progress: Schools must meet proficiency levels for the school as well as for the student subgroups, including major ethnic and racial groups, students with disabilities, economically disadvantaged students, and students with limited English proficiency (Gill, Lockwood, III, Martorell, Setdoji, & Booker, 2009).

Access Points: Expectations that are written for students with significant cognitive disabilities to provide them the ability to access the general education curriculum. Access points are embedded in the Common Core Standards and reflect the core intent of the standards with reduced levels of complexity. The three levels of complexity include *Participatory (Pa)*, *Supported (Su)*, and *Independent (In)*; the *Participatory* level is the least complex (Florida Department of Education, 2007).

Alternate Assessment: Any assessment that serves as an alternate way of gathering information on the progress and performance of students who do not take the regular state assessment with the majority of the school population (Zatta & Pullin, 2004).

Common Core Standards: Standards that were designed to be vigorous and relevant to students' real world. They reflect the skills and knowledge that students need to be successful in careers and college. These standards also provide a clear and consistent understanding of students' learning expectations so that teachers know how to teach and parents know how to help students (Common Core State Standards Initiative, 2012).

Equals mathematics curriculum: A PK-12 curriculum that provides mathematics curriculum (assessments and lessons) for educators who work with students in special education or in alternative education programs. Each lesson provides three levels of instruction for students with mild, moderate, and severe disabilities (Ablenet, K-12 Mathematics Curriculum, n.d.).

Exceptional Student Education: Instructional program in Florida for students with the following disabilities: Autism Spectrum Disorder (ASD), Deaf or Hard-of-Hearing (DHH), Dual-Sensory Impairment (DSI): Deaf-Blind, Emotional/Behavioral Disability (E/BD), Gifted, Homebound or Hospitalized (HH), Intellectual Disability (ID), Language Impairment (LI), Other Health Impairment (OHI), Orthopedic Impairment (OI), Specific Learning Disability (SLD), Speech Impairment (SI), Traumatic Brain Injury (TBI), and Visual Impairment (VI) for students ages birth to 2 years old (Florida Department of Education, 2005).

Florida Alternate Assessment: The alternate assessment that was developed for Florida to assess students with significant cognitive disabilities who are unable to be assessed with the Florida Comprehensive Assessment Test (FCAT; “Florida Alternate Assessment,” n.d.).

Florida Comprehensive Assessment Test: An assessment administered to students in grades 3-11 used to measure learning gains of the general education population and those students with disabilities who are able to take the FCAT with appropriate accommodations in mathematics, reading, science, and writing (“Florida Alternate Assessment” n.d.).

Individuals with Disabilities Education Act: A law ensuring services to children with disabilities throughout the nation, governing how states and public agencies provide early intervention, special education, and related services (U.S. Department of Education, n.d.)

Individuals with Disabilities Improvement Education Act: Requires states to provide a free appropriate public education (FAPE) in the least restrictive environment (LRE). The statute also outlines a detailed due process procedure that ensures all students receive FAPE. This law was originally enacted in 1975 as the Individuals with Disabilities Education Act to respond to increased awareness of the need to educate children with disabilities and to guide judicial decisions requiring states to provide an education for children with disabilities if education is provided to those without disabilities (Indiana Protective Services & Advocacy, n.d.).

Individual Education Program: A written legal document listing the special educational services that the child will receive. The Individual Education Program is developed by a

team that includes the child's parents, school staff, and other members that have input regarding the child, such as therapists, school nurses, and behavioral specialists (National Dissemination Center for Children with Disabilities, n.d.).

No Child Left Behind Act: Requires each state to establish standards, assessments, and accountability systems to ensure that every child achieves proficiency in reading and mathematics by the year 2014. In addition, each state is required to test all students in grades 3-8 and once in grades 10-12 on assessments that are aligned with reading and mathematics state standards (Gill et al., 2009).

Paraprofessional: Paraprofessionals may be known or referred to as a teacher's assistant or instructional aide. This person is a special education employee who is not licensed to teach, but performs various duties both individually with students and organizationally in the classroom to support teachers (Mauro, n.d.).

Students with Disabilities: Students with below average cognitive functioning in two or more adaptive behaviors with onset before age 18 (Special Education Terms and Definitions, 2009).

Sunshine State Standard Access Points: Modified standards that are challenging to the student but usually less difficult than the general education grade level standards (Center on Education Policy, 2009). Florida's access points are aligned with the Common Core Standards but at reduced levels of complexity.

Research Questions

This study was guided by the following research questions:

1. What statistically significant difference, if any, did the Equals mathematics curriculum have on the 2012 Florida Alternate Assessment mathematics scores of students with disabilities in the treatment group as compared to the mathematics scores of students with disabilities in the control group?
2. What perceptions of and attitudes toward the Equals mathematics curriculum exist among Exceptional Student Education (ESE) teachers who teach mathematics to students with disabilities participating in the Florida Alternate Assessment?

Limitations

This study was limited by the following:

1. Students' behaviors on the day of the assessment administration.
2. Students' medications at the time of the assessment administration.
3. Length of the placement subtests for the Equals mathematics curriculum and the requirement of the assessor to obtain numerous teacher gathered materials that are not provided with the assessment kit.
4. Lack of augmentative communication devices programed for student responses to assessment questions for the Equals curriculum and Florida Alternate Assessment.
5. Students' inabilities to answer questions due to physical disabilities in addition to lack of speech (i.e. unable to touch the correct picture to respond to the questions) for the Equals curriculum and Florida Alternate Assessment.

6. Demographics of the student population in the treatment group as compared to control group.
7. Educational services received by the student population in the treatment group as compared to the control group.
8. Teacher qualifications, certification, and endorsements in the treatment group as compared to the control group.
9. Separate class (self-contained) configuration in the schools in the treatment group as compared to the schools in the control group.
10. Possible budget difference for students with disabilities who participate in the Florida Alternate Assessment in the treatment group as compared to students with disabilities in the control group.

Delimitations

This study had the following delimitations:

1. Differences in the training or lack of training for the Equals curriculum received by ESE teachers in the treatment group (Central Florida School Districts A, C, D, E, F and East Coast Florida School District B).
2. According to the guidelines of the Equals mathematics curriculum, the paraprofessionals are unable to teach a new lesson. They are only permitted to do practice assignments and reinforcement with the students on lessons that were previously taught by the classroom teacher.

3. Some teachers in the treatment group do not have their own individual Equals mathematics curriculum kit for teaching mathematics to students with disabilities. These teachers are required to share kits.

CHAPTER 2 LITERATURE REVIEW

Roach, Elliott, and Webb (2005) believed that for schools to be effective there must be the coordination of three components of the educational environment. These three components are: curriculum, instruction, and assessment. These three components apply to both students with and without disabilities. However, Browder et al. (2004) contended that when the Education for All Handicapped Children Act of 1974 (P.L. 94-142) was passed, there was an absence of a curriculum model for the new services needed for students with disabilities, especially those with significant cognitive disabilities. Since the passage of P.L. 94-142, there have been many other laws that have been passed that have affected the education of students with disabilities. With the passage of these laws, Individuals with Disabilities Education Act (IDEA) of 1997, Elementary and Secondary Education Act (ESEA) of 2002, and No Child Left Behind Act (NCLB) of 2001, the federal government has showed its intent that students with disabilities should share in educational reform opportunities (Kohl, McLaughlin, & Nagle, 2006). These federal laws, and others, have included provisions that require students with disabilities to be included in achievement and content standards, accountability systems, and assessments that are at the foundation of these educational reforms.

The Improving America's School's Act (IASA) of 1994 and the Individuals Disabilities Education Act (IDEA) of 1997 expect that regardless of a student's disability, the student would be appropriately included in all systems of state assessments. This

required designing alternate assessments for those students with significant cognitive disabilities (Marion & Pellegrino, 2006). Roach et al. (2005) pointed out that states were required to not only create but to implement alternate assessments by July 1, 2000. The law also required that the scores of students participating in alternate assessments be included in public accountability reporting. The 1997 Reauthorization of IDEA was the first law to specifically require the inclusion of students with disabilities in state- and district-wide assessment programs. However, as noted by Roach et al., there was approximately 0.5% to 2% of the student population who had disabilities that made their participation in these standardized assessments impractical. Not only was it impractical, it also resulted in inaccurate measures of their academic achievement due to the fact that a student with a cognitive disability may not be able to understand or be able to respond to the questions on these state and district standardized assessments.

The 1997 Reauthorization of IDEA began to include testing accommodations that are written in students' Individual Education Programs (IEP) and are specific to each student's needs. Not only did this reauthorization address IEP testing accommodations, one of the final regulations under IDEA (34 C.F.R. § 300.347) requires that the IEPs of students with disabilities take part in state- and district-wide assessments with accommodations. It further requires that students with disabilities have instruction and opportunities that would allow them to make progress toward district and state academic standards (Roach et al., 2005). According to Roach et al (2005), it was recognized that another form of assessing the academic growth and achievement of that 0.5% to 2% of students with disabilities was necessary. This is how alternate assessments were born.

The amendments of the 1997 IDEA required the state or the local educational agency (LEA) to create guidelines that allow for students with disabilities who cannot participate in state- and district-wide assessments to participate in alternate assessments. As previously stated, these alternate assessments were mandated to be developed and being used no later than July 1, 2000 (Kleinert et al., 2002; Roach, et al., 2005).

As Kleinert et al. (2002) discussed, with the passage of the 1997 amendments of the IDEA (PL 105-17), a new emphasis was placed on improved outcomes and educational results for students with disabilities. This was evident in the mandate that all students with disabilities be included in the district and state assessments, including alternate assessments. In addition to IDEA 1997 requiring that all students with disabilities participate in end-of-year state assessments (even alternate assessments), an emphasis was placed on progress that requires educators to provide students with and without disabilities instruction on the same concepts and skills found in the general education curriculum while making acceptable progress toward the IEP goals (Witzel & Riccomini, 2007). Kohl et al. (2006) stressed that even with the passage of IDEA 1997; the U.S. Department of Education found that it was not appropriate to hold all students with disabilities to grade level standards or general district- and state-wide assessments. There was a population of students with disabilities that needed another form of evaluating their academic achievement and progress.

The No Child Left Behind Act (NCLB) was enacted in 2001. This Act, as well as the Individuals with Disabilities Education Act (IDEA) 2004, requires that students participate in statewide assessments (U.S. Government Accountability Office, 2005). It

further requires that the level of participation of students with disabilities, as well as the results of the assessments, be reported publicly and that these results factor into schools' Adequate Yearly Progress (AYP) and school grades. NCLB increased the accountability for schools, districts, and states based on the results of the alternate assessments. It also defined the public reporting requirements of performance and participation of all students (Quenemoen, 2008). When first initiated, NCLB statutory requirements did not allow differentiated achievement standards or content; however, new regulations were released in 2003 that allow the option for the development of alternate achievement standards (AAS), also known as Access Points, for up to 1% of the total student population in the grades being assessed. These alternate achievement standards had to be developed using a documented and validated method (Quenemoen, 2008).

Since the enactment of No Child Left Behind Act of 2001, states have experienced continuous changes in how they define and implement alternate assessment (Kohl et al., 2006). NCLB placed an emphasis on the necessity of closing the achievement gap between low- and high-performing students. It was also designed to improve the low performance of minority students and those students from disadvantaged groups. In regards to students with disabilities, the most notable part of the NCLB legislation is the requirement that all students, including those with disabilities, are to perform at a proficient level on state assessments. There are provisions written into NCLB that hold schools, districts, and states accountable for any lack of improvement in student achievement (Witzel & Riccomini, 2007).

NCLB specifies that students with disabilities must meet state expectations for Mathematics, Reading, Writing, and Science and that annual testing occur in grades 3-8 and again in high school grades 9 through 11. NCLB also mandates that schools and districts to close the achievement gaps between non-disabled students and students with disabilities. Students with disabilities are also mandated to be included in regular state testing programs as much as appropriately possible (Browder et al., 2003; Collins, Karl, Riggs, Galloway, & Hager, 2000; Denbroeder, 2008; Karvonen & Huynh, 2007).

As indicated by Marion and Pellegrino (2006), the standards and assessment peer review processes mandated by NCLB, brought about requirements for documenting the technical quality of assessment; however, the biggest change was documenting the technical quality of alternate assessments (AA) based on alternate achievement standards (AAS). These reforms implemented by NCLB are built around four principles: (a) flexibility for states and local schools, (b) increased accountability, (c) data-supported methodology, and (d) expanded options for parents (Towles-Reeves, Garrett, Burdette, & Burdge, 2006).

Roach et al. (2005) noted that alternate assessments are important to the state's assessment system and must also meet the federal requirements that are outlined in the Elementary and Secondary Education Act of 2002 and the Title I component of ESEA 2002 (Elliott, Compton, & Roach, 2007). Since 2002, both policymakers and educators have grappled with issues of how to meet the NCLB requirements and achievement goals for students with disabilities, especially those students with significant cognitive disabilities (Center on Education Policy, 2009). For most states, this has been noted to be

a complex challenge because there is such variability in how states assess students with significant cognitive disabilities and how they interpret the NCLB alternate assessment requirement (Browder et al., 2003). The ESEA of 2002, as amended by NCLB of 2001, requires state alternate assessments “be aligned with the State’s challenging content and student academic performance standards, and provide coherent information about student attainment of such standards” (Elementary and Secondary Education Act, 2002).

Based on these needs, on December 9, 2003 the United States Department of Education issued final regulations for students with the most significant cognitive disabilities to be included in Title I assessments effective January 8, 2004. In order to align these major regulatory and legislative requirements that were affecting states and educational systems, IDEA was reauthorized in 2004. This reauthorization is known as the Individuals with Disabilities Education Improvement Act (IDEIA). While the IDEA mandates that alternate assessments be created and implemented for students with significant cognitive disabilities, IDEIA addresses how students would be included in the accountability systems that were later established by No Child Left Behind Act (NCLB) of 2001. It reaffirmed that all students with disabilities must be included in academic assessments being used for accountability purposes (Kohl et al., 2006).

With IDEA, NCLB, ESEA, IASA and IDEIA, a second shift occurred that added general education curricula and how to align it to alternate assessments (Browder et al., 2004; Quenemoen, 2008). Quenemoen (2008) found that after the implementation of NCLB requirements, the shift in content continued and now more states are refocusing on academic content and moving away from functional skills; however, educators in many

schools continue to find a way to include functional skills, self-determination, and social inclusion into academic curricula. These laws have led to accountability for all students, including those participating in alternate assessments, in addition to the shift in curriculum.

The 1965 Elementary and Secondary Education Act (ESEA) was reauthorized in 2001 as the No Child Left Behind Act (Kohl et al., 2006). States are required to establish challenging standards and hold schools and school districts accountable for the achievement of all students by implementing assessments that measure the students' performances against the standards, even if they are Alternate Achievement Standards (AAS). This mandate was designed to continue ESEA's original goal of attempting to close the achievement gap between students with disabilities and students without disabilities with an overall goal of all students reaching grade level proficiency in mathematics and reading by 2014.

Until recent years, there had been two systems of accountability. There were tests for general education students and other forms of alternate assessments for special education students but only the general education tests were being included in school accountability (Zatta & Pullin, 2004). Zatta and Pullin (2004) observed a push for a unified educational accountability system. This was based on the realization that true accountability is obtained only when all children are considered in the planning, development, and implementation of assessments. The first alternate assessments developed in many states only evaluated students' performance of functional skills (Browder et al., 2004). However, Browder et al. (2003) contrasted that alternate

assessments now have to include subject areas of science, language arts, reading, and mathematics in order to collect the data needed for No Child Left Behind and school accountability.

Across the country, many stakeholders began seeing the positive consequences of the inclusion of students with disabilities in their accountability systems (Quenemoen, 2008). The U.S. Office of Special Education wanted the intent of alternate assessments being part of large-scale educational assessment systems to be that schools are accountable for the education of all students (Kleinert et. al., 2002). Quenemoen and Thurlow (2002) commented that there was a concern of how alternate assessments results would be combined with general assessment results for purposes of accountability since alternate assessments are based on alternate achievement standards and involve different assessment approaches. Alternate assessments must yield valid information for accountability purposes in regards to the achievement and learning gains of students with disabilities (Elliott & Roach, 2007).

It was explained by Quenemoen and Thurlow (2002) that previous research concluded that there are several essential questions that states should address when considering the options for the inclusion of alternate assessment scores for purposes of accountability. These questions are: (a) what will encourage the greatest improvement for every student (with and without disabilities), (b) what is fair, and (c) what seems reasonable? Since decisions are based on school accountability, it is imperative to include all students in the accountability system. It is also imperative that alternate assessments

raise the expectations for students with significant cognitive disabilities and improve their education (Quenemoen, 2008).

One major component of the school accountability system is Adequate Yearly Progress. The 2001 passage of the NCLB Act caused the technical requirements for alternate assessments to increase now that the alternate assessment scores are counted toward a school's AYP (Elliott & Roach, 2007). With NCLB's December 2003 final regulation and the guidance brought about in 2005, it was made clear that alternate achievement standards are only appropriate for a small percentage of students (those with significant cognitive disabilities and who meet specific criteria) (Kohl et al., 2006). NCLB mandates that the number of proficient scores of students with disabilities participating in alternate assessment included in district and state level AYP may not exceed 1% of all students in the grades tested. This totals approximately 9% of all students with disabilities. As Kohl et al. (2006) reported, there is a stipulation that if a state can demonstrate that their population of students with significant cognitive disabilities is larger than the 9%, they may apply for an exception that would permit them to exceed the 1% cap (34 C.E.R. §200.13[c][2]).

By 2000, states had to implement alternate assessments for students with the most significant disabilities that were unable to participate in general education assessments even with accommodations (Karvonen & Huynh, 2007; Roach & Elliott, 2006). Alternate assessment is a generic term used for a group of assessment methods used to assess the academic achievement of students with significant cognitive disabilities (Elliott & Roach, 2007). Quenemoen (2008) indicated that most states already had an initial

version of an alternate assessment being used prior to NCLB being passed. Kleinert et al. (2002) mentioned that alternate assessments were first implemented in Kentucky.

By 2008, all 50 states had an assessment system in an effort to meet the federally required 95% participation rate of all students and subgroups (including students with significant cognitive disabilities). As Elliott and Roach (2007) pointed out, the alternate assessments being used in a number of states are technically flawed due to (a) unreliable scores, (b) scores of unknown validity, (c) poor alignment with content standards, and/or (d) proficiency scores that are not in line with the No Child Left Behind policy as it pertains to Adequate Yearly Progress.

Alternate assessments are an important part of the assessment system of each state and are required to meet federal regulations outlined in Title I of the Elementary and Secondary Education Act (ESEA) of 2002. Alternate assessments must be aligned with the state's content standards and yield separate results in both reading and mathematics. Alternate assessments must further be designed and implemented in such a manner that allows the results to be used as an indicator of Adequate Yearly Progress.

Quenomeon and Thurlow (2002) suggested that alternate assessments provide an avenue for students with significant disabilities to be included in district and state assessments. However, these assessments must be viewed as defensible and credible assessment activities and not just classroom activities (Marion & Pellegrino, 2006). In the past, the academic achievement of thousands of students with disabilities in the United States had not been accounted for in a statistically sound and meaningful manner.

This had occurred even though a large portion of these students had participated in state alternate assessments (Elliott et al., 2007).

In response to the federal policies that have been implemented, states have developed varieties of alternate assessments (Kohl et al., 2006). A survey was conducted in 2003 of state special education alternate assessment practices and policies. The survey found that there was a large variation of alternate assessments among the states. There were several states that were using more than one type of alternate assessment. Kohl et al. (2006) and Roach et al. (2005) found that 23 of 50 states surveyed were using portfolios. At the time of the survey, 15 states were using a checklist or rating scale, 9 states were using performance tasks or events, and 4 states were using Individualized Education Program (IEP) analyses. Since 2003, the percentage of states using portfolios has decreased and the percentage of states using off-level (i.e. below grade-level) assessments being used has increased. There were concerns that too many students with disabilities were participating in these types of assessments to avoid the mandatory accountability consequences. Regardless of how alternate assessments vary across states, there is a need for researchers and studies to examine these state systems, especially in regards to the technical issues of validity and reliability (Towles-Reeves et al., 2006).

Elliott et al. (2007) reported that there have been three major approaches of alternate assessments for students with disabilities that have been prevalent around the country. These approaches are: Performance Assessments, Comprehensive Rating Scales of Achievement, and Portfolio Assessments (i.e. performance tasks/events, body of work, checklists). Even though these alternate assessments all have different names

and different attributes, they all require a collection of evidence of the student's work. This work can include, but is not limited to: video/audio recordings, structured observations, classroom work products, and interviews. All the evidence is meant to measure the knowledge and skills (as aligned or linked to state grade level content or alternate achievement standards) that the student has retained. Curriculum-based measurement (CBM) is another technology that is being used as a form of alternate assessment. It provides the student with a continuum of tasks that measure the student's basic skills in mathematics and reading (Elliott et al., 2007). This CBM strategy allows individualization of the assessment by only administering assessment items for those tasks that are considered appropriate to that particular student's instructional experiences and current skills.

Regardless of the type of alternate assessment being used, the United States Department of Education's (USDOE) *Alternate Achievement Standards for Students with the Most Significant Cognitive Disabilities* (published in August 2005), as well as NCLB, has mandated that alternate assessments must meet standards of high technical quality that is required of other educational assessments. These high technical quality standards include reliability, validity, usability, objectivity, consistency and accessibility (Elliott & Roach, 2007; Elliott et al., 2007; Kohl et al., 2006). Elliott and Roach (2007) contended that as educators move toward meaningful inclusion of students with disabilities in district and statewide assessment and accountability systems, alternate assessments must be understood and analyzed. Additionally, alternate assessment must have specific guidelines for student eligibility, explicit structure, and scoring criteria and procedures

that are clearly defined. They must also have a format of reporting that clearly communicates the student's performance in regards to academic achievement standards or alternate achievement standards.

The No Child Left Behind Act (2001) stresses how important it is to use valid and reliable data for decision-making in regards to students with disabilities. It mandates that alternate assessment scores be valid for individual score reporting as well as the reporting of aggregated scores by student groups based on demographic information such as primary exceptionality (type of disability), race and ethnicity, and socio-economic status (SES). Regardless of the approach/type of alternate assessment, each must be able to yield valid and reliable results (Elliott & Roach, 2007).

It was the observation of Quenemoen and Thurlow (2002) and Towles-Reeves et al. (2006) that in order for alternate assessment results to be included in accountability systems, the assessments must be well-developed and the results must be valid and reliable for the purposes for which they are intended. Quenemoen and Thurlow cited five characteristics of a well-developed alternate assessment. First there has been careful consideration in the selection of policymakers and stakeholders and a clear definition of the desired outcome(s) for each group while reflecting best practices and research. The second characteristic is that the methods of the assessment have been carefully developed, tested, retested, and refined. Thirdly, standards that have been professionally accepted are used to score the assessment items (i.e. dual scoring third party tie breakers, adequate training, rechecks of scorer competence and reliability tests). Next, an accepted standards-setting process must be used so the results of the alternate assessment can be

included in score reporting and accountability. Finally, a well-developed alternate assessment is continuously reviewed, changed and improved.

In addition to well-developed characteristics to consider, there are also technical difficulties that must be taken into consideration when developing alternate assessments (Quenemoen & Thurlow, 2002). One difficulty is how to scale the results of alternate assessments so that the values given for achievement levels are the same/similar to the values given for general assessment achievement levels. In order for this option to work, the student population for each assessment (alternate versus general) must be clearly defined. A second difficulty is the method in which the results must be scaled in a way that the achievement levels on alternate assessments are at the lower end of the scale.

The drawback of this option is that it does not allow for students with disabilities who participate in alternate assessments to ever be able to achieve proficient status. Marion and Pellegrino (2006) pointed out that due to the very small number of students who participate in alternate assessments and how each student may approach the subject matter being assessed very differently, there are more challenges for documenting the technical quality of alternate assessments versus performance-based assessments.

Elliott and Roach (2007) discussed that alternate assessments that have been designed in response to NCLB and IDEA requirements do not meet the technical standards that have been established for educational tests. This makes it difficult to determine how well students with disabilities are progressing, including how well they are achieving standards-based criteria in mathematics, science, and reading/language arts. Kohl et al. (2006) noted there are issues that impact the technical quality of alternate

assessments such as documentation of student work and the student's ability to perform on a pencil and paper test. Other issues include eligibility criteria, the content being assessed (i.e. academic versus functional skills), state or alternate achievement standards alignment, the definition of performance thresholds, and the actual administration and scoring procedures of the alternate assessments (i.e. rubrics, types/numbers of scorers). These issues can create questions of the accuracy of the results of the alternate assessments and can prevent states from interpreting the results meaningfully.

There are four main technical requirements that must be examined regarding the technical aspects of alternate assessments, regardless of what type of alternate assessment is being used (i.e. portfolio, checklist, standardized alternate assessment). These four requirements are reliability, validity, scoring and results. As Elliott and Roach (2007) wrote, all high quality assessments should be valid and reliable. In order for the alternate assessment to be a high-quality assessment, it should be strongly influenced by these technical requirements. States must ensure that they are periodically collecting data through a systematic plan so that it impacts the validity and reliability of alternate assessments. This data collection should be done in order to provide confidence in the results for external reviewers and users. Regardless of the type of alternate assessment, it must yield valid and reliable results (Elliott et al., 2007).

Towles-Reeves et al. (2006) explained that while there has been minimal research on the reliability of alternate assessments, it is developing. It was believed by Elliott, et al. (2007) that it is challenging for states utilizing portfolio-based alternate assessments to find reliability in the scores. This reliability issue can be attributed to the objectivity of

the raters and what their subjective thoughts are about the portfolio. Other states utilizing performance assessments in addition to portfolios as part of their general large-scale assessment systems also have challenges with the reliability of ratings/scores. These challenges present an inability for those particular states to publicly report the results of the alternate assessments. Elliott and Roach (2007) stressed that one of the most important characteristics of a quality alternate assessment is its validity; however, consumers of alternate assessments also want the results to be reliable. An alternate assessment is considered to be reliable to the extent that the scores are similar or almost the same as measurements that are repeated within that assessment. While validity is one of the most important characteristics, there is a noticeable absence from the literature regarding a thorough analysis of the validity of alternate assessments (Towles-Reeves et al., 2006).

The way alternate assessments are utilized and their validity has been questioned for every type or method of assessment. Elliott et al. (2007) stated that if alternate assessment scores of students with significant cognitive disabilities are expected to be included in the district and state accountability systems, valid and reliable measures for assessing these students is imperative. The technical requirement for alternate assessments to be of high quality should strongly influence the validity studies of their designs and the interpretation of their results. The design requirements for a technically sound alternate assessment should be what drive the validity of the evaluations.

Based on the scope and requirements of the reauthorization of the Improving America's Schools Act of 1994 and the subsequent passage of the No Child Left Behind

Act (NCLB; PL 107-110), the validity issues of large-scale assessments, especially alternate assessments for students with severe cognitive disabilities, need to be examined (Towles-Reeves et al., 2006). In order for state assessment systems, including alternate assessments, to meet NCLB mandates, they must be consistent with relevant, nationally recognized technical and professional standards, be supported by evidence, be of adequate technical quality for each purpose, and be valid for the purpose(s) for which the assessment system is used.

According to Elliott et al. (2007), the first study published on validating an alternate assessment portfolio was done in 2004 by Evelyn Johnson and Nancy Arnold. The researchers, Johnson and Arnold, examined the Washington (state) Alternate Assessment System (WAAS) and its validity. The conclusion of the study was that there were serious shortcomings in the evidence for response process, contents, and structural validity. Johnson and Arnold also identified several of the sources of the invalidity of the WAAS including: (a) a student's total portfolio score was primarily determined by the scores of the generalization skills, yet the basis for this score was not clear, (b) some of the portfolios did not measure the state's content or alternate achievement standards, and (c) the teachers' ability to assemble the portfolio significantly contributed to the students' scores. Furthermore, the researchers concluded that portfolios appeared to be more of a reflection of the ability of the teacher to put together a portfolio according to guidelines and not the performance of the student. For the portfolio to be valid, it should be an accurate measure of a student's progress toward his/her Individual Education Program

(IEP) goals and objectives or a measure of how successful the program was in students accessing state content or alternate achievement standards.

Research has been conducted on alternate assessments' consequential validity (Towles-Reeves et al., 2006). Consequential validity examines consequences of an alternate assessment that are both intended and unintended. The intention within consequential validity is closely linked to the social validity of alternate assessments. In other words, is there acceptance of the alternate assessment by those participating in the assessment and those administering the assessment? While considering the consequential validity of alternate assessments, states must link alternate assessments to policies and instructional practices as well as ensure that socially valid assessments, objectives, and procedures are developed (Towles-Reeves et al., 2006).

When examining accountability as it relates to the validity of alternate assessments, many students with significant cognitive disabilities are being left out unintentionally. This can lead to these students being left behind since the alternate assessments may yield results that have questionable validity (Towles-Reeves et al., 2006). With alternate assessments, there is an overwhelming importance to address the question of whether or not the assessment achieved the purpose(s) for which it was intended. It was suggested by Elliott and Roach (2007) that there should ultimately be a statement regarding the validity of the alternate assessment that involves an evaluative judgment of the degree to which the uses and interpretations of the alternate assessments results are justified. The third technical requirement for alternate assessments is the scoring of the assessments. Scoring includes who is scoring the assessment, how it

scored, what is scored and how those scores are reported or factored into the accountability system of the state. How alternate assessments are scored and the consequences of the utilization of the scores are very important to students with disabilities (Towles-Reeves et al., 2006).

Browder et al. (2003) observed that practices currently being used by states and school districts are filled with problems that threaten the potential of alternate assessments. These problems include: combining system quality scores with student performance, assigning the lowest levels of proficiency to students with disabilities, using alternate assessments with poor technical quality, and failing to use performance indicators that are aligned with the academic content or alternate achievement standards of the state. These issues can result in school administrators and teachers not wanting programs for students with significant cognitive disabilities at their schools for fear that the effect of these students' scores will lower school grades and affect school accountability. It was indicated by Zatta and Pullin (2004) that it is imperative alternate assessments have accurate scores, are meaningfully linked to the instruction in the classroom, and reflect the information they are intended to collect.

Kohl et al. (2006) found that there was a considerable variation that exists among the states in regards to how alternate assessments are scored. This occurs even though most states utilize rubrics that include system criteria that measure how students learn (i.e. level of prompting) and actual student achievement. Another factor in this variation is that while the majority of states have teachers from other school districts score the

alternate assessments; some states are using the state education agency, the test development contractor, or the student's IEP team and/or teacher.

It was reported by Quenemoen and Thurlow (2002) that there are three different scoring approaches being utilized by states in terms of accountability. Option I utilizes alternate assessment with different counting rules and labels. Under Option I, the general assessment and alternate assessment are different. This option can be found in Florida. Florida utilizes the Florida Comprehensive Assessment Test (FCAT) as its general assessment and the Florida Alternate Assessment (FAA) as its alternate assessment. Option II utilizes two alternate assessments that are counted differently.

One alternate assessment is designed for students with significant cognitive disabilities (i.e. portfolio) and the other alternate assessment is utilized with those students who may not be able to take the general assessment but are also not eligible for the portfolio assessment. Under Option II, both forms of alternate assessment are included in the accountability system but in different ways. Finally, Option III is having an alternate assessment that has the same counting and labels for achievement that are assigned to the general assessment. The same point values are used for both the alternate assessment and general assessment. In addition to these three alternate assessment options, Elliott and Roach (2007) noted that another form of alternate assessment is being considered. This new alternate assessment would evaluate the growth of students with significant cognitive disabilities and yield scores that indicate progress.

The Center for the Improvement of Educational Assessment conducted research on Option I. The results showed that if the number of participants of the alternate

assessment remains constant year after year, then the impact of including the alternate assessment scores is trivial (Quenemoen & Thurlow, 2002). Furthermore, the research showed that gains made on the alternate assessments that are similar to the gains made on the general assessments, little measurement error was introduced. Lastly, the research showed that there appeared to be better outcomes for students who participated in the alternate assessment when the results of the alternate assessment was included in accountability systems.

When scoring alternate assessments, the assessment scores are reported on scales that are designed to assist with the interpretation of scores (Elliott & Roach, 2007). The scoring typically begins with responses to separate tasks or items. The item scores are then combined to obtain a raw score (0-144). With students with significant cognitive disabilities, raw scores can be difficult to interpret if there is an absence of additional information (i.e. type of exceptionality, mode of communication, use of assistive technology, etc.). Statistical analysis and interpretation can be facilitated by converting the raw scores into a set of scale scores or derived scores. This process of conversion is referred to as scaling a test. By doing this, cut scores can then be established for either scale scores or raw scores. Elliott and Roach (2007) declared that this is the method typically used to interpret the meaning of students' scores on almost all assessments, both general and alternate, that are used for the purposes of NCLB.

There should be a close connection between cut scores and certain scale scores and standards. In order for a scale score to have been created, there must be a successive score range defined by a series of cut scores that are clearly labeled (i.e. Below Basic,

Basic, Proficient, and Advanced or Level 1, Level 2, Level 3 and Level 4). The item or task level scoring rubrics must connect to the performance level descriptors in a meaningful way. Finally, for the final scores on alternate assessments to be considered a valid indicator of achievement in reading and/or mathematics for the purposes of Adequate Yearly Progress under NCLB, the scores must be a measure of actual student achievement and not assistance from the teacher (Elliott & Roach, 2007).

Assessment results are the fourth technical component as noted by Elliott and Roach (2007). The inclusion of alternate assessment results in school accountability systems is an integral part of maximizing the benefits of assessing students with disabilities (Quenemoen & Thurlow, 2002). While the results are an integral part of alternate assessments, Elliott et al. (2007) contended that there were inquiries regarding the utilization of the results of statewide alternate assessments when making decision about instruction and curriculum as well as monitoring the educational performance of the students at the classroom, school and district levels.

Towles-Reeves et al. (2006) proposed that the intention of state alternate assessments are meant to impact the following: (a) instructional strategies and content as well as curricula, (b) professional development support, (c) student, teacher, and administration effort and motivation, (d) improved learning for all students, (e) nature and use of test preparation activities (f) format and content of classroom assessments, (g) student, teacher, parental, administration and public beliefs and awareness about alternate assessments, and (h) the criteria for judging student performance, and (i) the utilization of the results of the alternate assessments.

However, Towles-Reeves et al. (2006) cited there are also unintended consequences of alternate assessments that may not be as positive as those previously listed. These consequences can include: (a) using test preparation materials that are based on the assessment without ever making changes to the curricula and instruction (regardless of student needs), (b) narrowing the instruction and curricula to focus on the specific learning outcomes being assessed (i.e. if functional skills are not part of the alternate assessment, they may not be included in the instruction of students with significant cognitive disabilities), (c) administration inappropriately using test scores, and (d) using unethical test preparation materials.

How the results of alternate assessments are communicated is another key issue about the utilization of alternate assessments (Elliott & Roach, 2007). When the results are reported in a way that is understood by most, especially teachers, it increases the likelihood that the results will be used in a positive manner. This usage includes assisting parents and students themselves in understanding the students' performances. It can also increase the facilitation of educators' instructional efforts. Information about achievement gains of students with significant cognitive disabilities is very important to teachers and the students' parents. Student results of alternate assessments should be used to improve curricula and instruction.

It was stressed by Kohl et al. (2006) that students with significant cognitive disabilities must be assessed with alternate assessments when necessary and as indicated in their IEPs. It is not adequate for alternate assessments to just be named as the form of assessment for all students with disabilities. Specific guidelines/criteria must be

developed to determine the eligibility of students with disabilities to participate in alternate assessments.

The relationship of the alternate assessment and the student's Individual Education Program (IEP), specifically present levels, goals, objectives, and accommodations is key to the utilization of these assessments. Towles-Reeves et al. (2006) commented that the IEP is a tool designed to assist students, families, and school personnel in making determinations regarding the educational opportunities that are necessary for students with disabilities to achieve educational goals and objectives that have been individualized to a particular student. Professional development of educators needs to include information on developing quality IEPs and tracking student progress in a valid and reliable manner while relating all this to the alternate assessment.

According to Towles-Reeves et al. (2006), researchers have attempted to examine what influence alternate assessments and their components have on the development of the IEP and classroom instruction by using teacher surveys. The results of the study showed that alternate assessments influenced the development of IEPs as well as the instruction of students with disabilities. Even though this research provides evidence that there is a link between the intended purpose of the alternate assessment, which is to provide increased educational opportunities and improve instruction, some states do not link the alternate assessment to the student's IEP and utilize portfolios or checklists that are not related to the student's IEP goals and objectives.

Elliott and Roach (2007) pointed out that it was initially acceptable for the students' alternate assessment to be loosely aligned to content or alternate achievement

standards without providing a common framework for proficiency summarization.

However, IDEA 1997 mandates that the IEP goals must be focused toward progress in general education curriculum. A direct connection between the alternate assessment and IEP is becoming more and more evident as states move toward standards-based IEP goals and objectives for all students (Towles-Reeves et al, 2006).

Teachers may need to be provided with guidelines on how to track the progress for the new requirement of the utilization of the alternate assessment results if the alternate assessment itself does not have a clear link to the IEP (Towles-Reeves et al. (2006). Collins et al. (2000) revealed that this linkage can create a dilemma because the Individualized Education Program (IEP) team may prioritize functional skills (i.e. daily living tasks, establishing and following schedules, and communicating) for the student; however, the teacher will also need to balance teaching these skills with the academic curricula that is now required to be taught. This is especially true for the 1% of students with significant cognitive disabilities who participate in alternate assessments as required by NCLB.

All assessments affect what teachers are teaching as well as what students are learning, regardless if the students have disabilities or not (Towles-Reeves et al., 2006). This is true especially in the field of special education where large-scale alternate assessments have been used by educational reformers in an effort to influence the instructional practices at the school level. This is being done in an effort to link classroom instruction and educational reform. Teachers of students with disabilities have been generally favorable about the inclusion of students with moderate to significant

disabilities in schools and state accountability measures. These educators saw the benefits for their students despite the increase of teacher frustration due to the extra workload that is a result of the alternate assessment process.

There are issues when examining the relationship of alternate assessments and the frustration of teachers. Teachers of students with significant cognitive disabilities have further reported that in order to successfully implement alternate assessments, they need adequate support (Towles-Reeves et al., 2006). Elliott and Roach (2007) acknowledged that even though alternate assessments are used with a small population of students with disabilities, they demand a significant amount of time from teachers (i.e. in Florida, the teacher must administer the Florida Alternate Assessment in a one-on-one setting with the student) and more time is required of state assessment professionals to develop, implement, and evaluate alternate assessments. This may become more of an issue as states adopt value-added models for teacher evaluations and a percentage of their evaluation is based on student performance on state-standardized regular assessments (i.e. FCAT) and alternate assessments (i.e. FAA) (Browder et al., 2003).

It is still left to question whether NCLB's requirement for students with significant cognitive disabilities to participate in alternate assessments has increased teachers' and administrators' expectations of these students. (Browder et al., 2003). Towles-Reeves et al. (2006) declared that even those teachers who are committed to sound educational practices find themselves in a state of confusion about the link between the outcomes of alternate assessments and instruction. This is especially true when the relationship of the alternate assessment to the student's IEP is not defined in the

state's process. However, the need to teach the core, academic content and functional skills is often putting educators of this student population in a dilemma (Collins et al., 2000). Educators can do both successfully by either identifying academic content or embedding it into instruction while teaching functional skills or by identifying functional skills and adding these skills into instruction of required academic content. Browder et al. (2003) indicated that if educators only teach academic standards to students with significant cognitive disabilities, this will most likely result in post-school outcomes at the lowest levels of proficiency unless functional skills can also be used as achievement standards.

The primary purpose of alternate assessments should be to improve the quality of programs for students with significant cognitive disabilities (Browder et al., 2003) but these alternate assessments also impact teachers. Educators must learn how to use the alternate assessment results to not only document student achievement but to extend and enhance student learning. Alternate assessment data must be used as part of the ongoing instructional decision making and if this is done, both the teacher and student will benefit significantly because instructional effectiveness will improve and student learning will accelerate. All of these objectives can be met while meeting the requirements of IDEA, NCLB, and IDEIA.

Alternate assessments and the results of alternate assessments have a relationship with the curricula for students with significant cognitive disabilities. The school accountability movement of including alternate assessment scores in district and state level accountability systems has been one of the strongest influences on decisions made

regarding curricula for students with significant cognitive disabilities (Browder et al., 2004). Roach et al. (2005) suggested that in addition to measuring what students with significant cognitive disabilities are learning, alternate assessments should be relevant to the curricula. In many schools, the instruction and curricula of students who participate in alternate assessments significantly differs from the curricula of other students in the school. There is also the potential purpose for most states to use the results of alternate assessments to provide instructional feedback that can offer guidelines for the development of future learning and instructional goals (Elliott & Roach, 2007).

Denbroeder (2008) remarked that there is an expectation that students with significant cognitive disabilities will have access to the same curricula as their non-disabled peers. Furthermore, there must be a system in place that ensures that these students receive instruction in the same academic skills and concepts as their non-disabled peers. Modified standards, also known as alternate achievement standards, help facilitate this instruction. One example where the expectations are being raised is in Kentucky (Browder et al., 2003). It is noted that research in Kentucky shows that academic domains (language arts and mathematics) rather than functional domains are being used for the state's alternate assessment. The researchers further note that this change in the curricula is helping teachers increase their expectations of students with significant cognitive disabilities.

Roach et al. (2005) stressed that test developers must determine the alignment between the instruction and curriculum that is provided to students with significant cognitive disabilities when creating alternate assessments. In addition to this

relationship, it is suggested that additional research needs to be completed in order to understand the correspondence between the state's academic or alternate achievement standards and alternate assessments and the students' Individual Education Programs (IEP).

When researching alternate assessments, alternate achievement standards, and curricula for students with significant cognitive disabilities, post-school outcomes for those individuals must also be taken into consideration. Policymakers are concerned about students with significant cognitive disabilities and their poor post-school outcomes as well as the low expectations placed on them. These policymakers have placed a strong emphasis on the instruction of these students and their access to the general education curricula and state standards (U.S. GAO, 2005).

When discussing the relation of alternate assessment scores to post-school outcomes of students with significant cognitive disabilities, it is important that a discussion be held regarding the measurement and conceptualization of life outcomes. Kleinert et al. (2002) observed that there had been little work done to address the relationship of school programming variables and/or achievement of students with significant cognitive disabilities to their post school outcomes. However, the measurement of life outcomes is increasingly being introduced to assess the outcomes of transition, especially for those students who require extensive services that span across multiple life domains (Kleinert et al., 2002). There are five accomplishments that are part of the essential framework for the approaches of life outcomes for students with

significant disabilities. These accomplishments are competence, choice, community presence, community participation, and respect.

Kleinert et al. (2002) inquired as to if there is empirical evidence using alternate assessments with students with significant cognitive disabilities actually results in increased learning. They also inquire as to whether or not alternate assessment scores that are higher predict enhanced life outcomes for these students after they complete their schooling. It was believed by Elliott and Roach (2007) that there are many parents and educators that want alternate assessments to yield valid information that will assist them with the future instruction of students with significant cognitive disabilities. The usefulness of alternate assessments will depend on the extent to which they lead to improved achievement of positive life outcomes (Kleinert et al., 2002).

Kleinert et al. (2002) noted there has been a moderately strong correlation between alternate assessment scores and best practices being implemented in the education of student with significant cognitive disabilities. It was further noted that effective instructional programming for this student population was reflected when alternate assessment scores were high. In addition to alternate assessment results, two factors were found to have a level of impact on post-school outcomes of students with disabilities. These two factors are verbal communication skills (students with little or no verbal skills consistently scored at the lowest end of the Life Dimensions Scoring Rubric) and a noticeable shortage of adult services (Kleinert et al., 2002). Five outcomes essential for students and their Individual Education Programs (IEP) and curricular planning process have been identified (Kleinert et al., 2002). These essential outcomes

are: (a) having a home (currently and in the future), (b) being healthy and safe, (c) participating in valued activities across settings, (d) having control and choice that is commensurate with the student's culture and age, and (e) having meaningful relationships.

A broad definition of these essential life outcomes can be found in the language of laws as far back as the 1990 and 1997 reauthorizations of the Individual with Disabilities Education Act (IDEA). IDEA 1997 defines transition as an outcome-oriented process that promotes the student's movement (transition) from school activities to post-school activities. These post-school activities include vocational training, post-secondary education, continuing and adult education, integrated employment (also including supported employment), community participation or independent living, and continuing adult education (Kleinert et al., 2002). According to IDEA 1997, these are all based upon the individual needs of the student while taking into account the interests and preferences of the student. Many of the things listed in IDEA 1997 are based in a functional/life skills curricula so this creates a contradiction to the requirements of No Child Left Behind (NCLB) because NCLB mandates require school districts to focus more on academic curricula versus functional skills curricula in order to meet the proficiency requirement.

In order to make the transition to academic proficiency as required by NCLB, regulations and non-regulatory guidance that accompanied the December 2003 NCLB regulations were released in August 2005. Under these regulations, states were granted flexibility to use Alternate Achievement Standards to measure the achievement of

students with significant cognitive disabilities (Kohl et al. 2006). These alternate achievement standards count toward local and state proficient levels in the calculation of Adequate Yearly Progress. Alternate achievement standards have been defined by the Department of Education as expectations of performance that differ in complexity from the grade-level achievement standards.

Alternate assessments relate to Alternate Achievement Standards because they are part of standards-based reform initiative that was designed to ensure a high standard of learning for all students (Quenemoen & Thurlow, 2002). Additionally, alternate assessments are moving into standards-based accountability partly because of No Child Left Behind Act of 2001 and the 2004 Reauthorization of IDEA (Marion & Pelligrino, 2006). Elliott and Roach (2007) found that the United States Department of Education's most recent non-regulatory guidance mandates that alternate assessments that are utilized in state accountability systems are required to be aligned with the content standards of the state.

Roach et al. (2005) discussed that many states are struggling to meet the requirements because the concepts and skills in the state's academic standards have been deemed irrelevant or inappropriate for students with significant disabilities. State reviews of alternate assessment practices suggest that most states have not provided information on the inclusion of skills in the alternate assessment that reflect the content of the state's academic standards. It was reported by Quenemoen and Thurlow (2002) that there is a broad effort to: (a) measure student performance by developing technically sound assessments, (b) describe what students should know and be able to do by defining

content standards, (c) determine acceptable levels of performance and create definitions for those levels, (d) hold schools accountable for students' learning by developing methods of using the assessment results, and (e) ensure that students both with and without disabilities have opportunities to learn the content.

The Individuals with Disabilities Education Act (IDEA) provides support for alternate assessments to be designed as a modification or as an extension of states' standards-based assessment systems (Roach et al., 2005). In order for alternate assessments to function as an element of the larger accountability system and measure progress toward the educational expectations that are applied to students without disabilities, a state must use the general education academic standards to form the alternate assessment's foundation (Quenemoen & Thurlow, 2002). This alignment to the general education academic standards is just one part of developing alternate assessments that are meaningful. The Council of Chief State School Officers (CCSSO) identified four preferred models for states to utilize as frameworks for their planning and conducting alignment studies. These models are: (a) the Council for Basic Education (CBE) model, (b) the Webb model, (c) the Surveys of Enacted Curriculum (SEC) model, and (d) the "Achieve" model.

Collins et al. (2000) discussed the skills selected for alternate assessments have to be aligned with state and national standards in each of the core content areas being assessed. It was indicated by Browder et al. (2003) that each state must clarify which standards are being addressed on the alternate assessment. In addition, they must state how the performance indicators for the standards would be adapted, if needed, for

students with significant cognitive disabilities. Elliott et al. (2007) explained that the U.S. Department of Education (USDOE) alternate assessments must be aligned with the content standards of the state and must yield separate results in both mathematics and reading/language arts. They must also be developed and implemented in a way that utilizes the alternate assessment scores as an indicator of Adequate Yearly Progress. To show the alignment to the state standards, the alternate assessments may have to include numerous work samples and/or tasks. This can result in a time-consuming and extensive assessment process. To help with this mandate, some states have created alternate achievement standards (AAS).

Kohl et al. (2005) remarked that if a state decides to create and/or adopt Alternate Achievement Standards, the state must ensure that the alternate assessment is only used with students with the most significant cognitive disabilities and it must measure their achievement against the alternate standards. It was further noted that there is limited research regarding methods used by states to expand or extend core content standards in order to align the academic content and general assessments with alternate assessments. To assist states with instructional programs for students with significant cognitive disabilities, the Department of Education created an additional category of alternate assessments that are aligned to modified standards (i.e. Florida's Sunshine State Standard Access Points). These modified standards are aligned with the standards for that particular student's grade level core content (U.S. GAO, 2005). Elliott and Roach (2007) wrote that there is further guidance provided by the USDOE in 2004 in the *Standards and Assessments Peer Review Guidance*. This document indicates that states are only

permitted to allow a limited number of students to participate in alternate assessments that are based on alternate achievement standards (AAS).

The AAS must be aligned with the academic content standards of that state (i.e. they must include skills and knowledge that link to grade-level expectations) and must promote students' access to the general education curricula (Elliott & Roach, 2007). Furthermore, the AAS must reflect the highest learning standards possible for students with significant cognitive disabilities. The alternate achievement standards are challenging to students with significant cognitive disabilities but are less difficult than the general education grade level standards (Center on Education Policy, 2009). Roach et al. (2005) report that alignment is the extent to which assessments and expectations coincide and serve in conjunction with each other to create a system that assists in students learning and what these students are expected to know and do.

Conducting assessments, specifically alternate assessments, of core academic concepts and skills represents a departure from the practices that have been traditional in the educational practice (Elliott & Roach, 2007). Lazarus and Thurlow (2009) revealed that each state has its own guidelines for participation in their alternate assessments and they each formulate the guidelines to be consistent with the objectives and purpose of their large-scale assessments. The expectations of the USDOE are that alternate assessments are designed so that the scores/results can be used in a technical way to promote sound growth analyses.

Florida uses the Florida Comprehensive Assessment Test (FCAT) to measure learning gains of the general education population as well as those students with

disabilities who are able to participate in the FCAT with appropriate accommodations. In order to provide an option for all students in Florida to participate in the state's accountability system, Florida implemented the Florida Alternate Assessment for those students with significant cognitive disabilities who are unable to participate in the FCAT ("Florida Alternate Assessment," n.d.). Denbroeder (2008) mentioned that the FAA was developed with the help of content area experts, professional test developers, teachers, and parents and was developed through Measured Progress. The assessment was originally based on the Sunshine State Standards Access Points (alternate achievement standards) in Mathematics, Reading, Writing, and Science ("Florida Alternate Assessment", n.d.); however, it is currently being amended to correspond to the general education Common Core Standards (CCS).

Florida Alternate Assessment score standards were set by a panel of 24 school district administrators, 36 general education teachers, 19 parents, and 39 ESE teachers ("Florida Alternate Assessment," n.d.). The performance levels of the FAA were determined by this panel through a standard-setting process. The panel determined the minimum raw score (cut-score) that a student must obtain to reach a designated performance level. To establish this cut-score, the panel examined actual student scores and the assessment itself. They also looked at the performance level descriptors and differentiated between the skills, abilities, and knowledge usually associated with the individual performance levels ("Facts about," n.d.).

There are nine performance levels on the Florida Alternate Assessment (see Appendix A). These are *Emergent* (level 1-3), *Achieved* (levels 4-6), and *Commended*

(levels 7-9) (“Facts about,” n.d.). *Emergent* indicates that from instruction and practice, the student has developed basic knowledge of specific academic skills but may need prompting or cueing. *Achieved* indicates that the student can demonstrate acquisition of specific academic skills that he/she has learned through practice and classroom instruction. *Commended* indicates that the student has mastered and is able to generalize the academic skills that he/she has learned from classroom instruction and practice. Students scoring a Level 4 or higher are considered to be proficient in that subject area.

Students who score a level 1, 2, or 3 on the prior year’s Florida Alternate Assessment and score at least one level higher on the next year’s administration of the assessment have shown growth (i.e. learning gains). Students who score a level 4 or higher on the prior year’s alternate assessment and maintain that level or score higher on the next year’s administration of the assessment are also considered to have made learning gains (“Facts about,” n.d.). Finally, students are considered to have made learning gains if they have maintained the same Level of 1-3 and gained at least 5 points. In addition, there is an additional weight of 1.1 given to students in the *Emergent* range (Levels 1-3) who have a score increase that is at least 7 points higher than the prior year. Beginning with the 2009-2010 school year, these learning gains, or lack thereof, began to be included with the general education FCAT scores in calculating school grades and schools’ Adequate Yearly Progress.

Denbroeder (2008) indicated that the FAA is administered each spring. The first field test was administered in the fall of 2007 to 4,000 students and the first official administration was in the spring of 2008 to more than 23,000 students. The FAA is

aligned with the FCAT (“Florida Alternate Assessment,” n.d.) and assesses the common core standards of the core content areas. This alternate assessment assesses Reading in grades 3-10, Mathematics in grades 3-10, Writing in grades 4, 8, and 10, and Science in grades 5, 8, and 11.

There are three levels of complexity on the Florida Alternate Assessment. The levels are *Participatory* (least complex), *Supported*, and *Independent* (most complex). The *Participatory* level concentrates on skills that are at the beginning stages of academic awareness such as recognizing a number, letter, or parts of a whole. The *Supported* level assesses skills that require performing basic academic skills such as solving simple math problems, reading words or identifying and recalling. Finally, the *Independent* level requires the student to be able to organize, analyze, and compare (i.e. identifying the main idea of a story, solving more complex math problems) (“Facts about,” n.d.). By having the three levels of complexity, students are able to work up to their maximum potential in each content area.

There are 16 items in each core content area and each item has three questions (one at the *Participatory* level, one at the *Supported* level, and one at the *Independent* level). Students start at the *Participatory* level and if they answer that question correctly, they move on to the next level with the opportunity to answer questions at all three levels (“Facts about,” n.d.). Students are able to earn one, two, or three points at the *Participatory* level, six points at the *Supported* level or nine points at the *Independent* level for a maximum total of nine points per item. If the student refuses to participate, he/she receives a score of zero. The maximum amount of points that can be earned in

each core content area is 144 (See Table 1). The amount of points earned determines the student's performance level.

The systematic data collection from alternate assessments and the instructional requirements associated with alternate assessments allow educators of students with significant cognitive disabilities to recognize that this student population is capable of doing significantly more than what was being expected of them in the past (Marion & Pelligrino, 2006). Quenemoen (2008) pointed out that when many of the alternate assessments were being created, questions arose as to what curricula to use as the foundations for the assessment (i.e. functional or academic). Curriculum programs were based on the developmental model and it was thought that the educational needs of this student population could best be met by focusing on their cognitive age instead of their chronological age.

In the late 1980s and early 1990s, most of the intervention studies concentrated on functional life skills and there was a strong consensus that curricula for students with significant cognitive disabilities shift from a developmental model to a functional model. At that time, this was transformational (Browder et al., 2004). However, No Child Left Behind (2001) brought about a dramatic departure from the inclusion practices and functional curricula that had traditionally been utilized with students with significant cognitive disabilities. NCLB places an emphasis on attaining academic achievement (Roach et al., 2007).

Roach et al. (2007) noted that previous instructional approaches, least restrictive environments (LRE) and mainstreaming focused on self-esteems and socialization

benefits for students with significant disabilities. Based on NCLB requirements, there is still a focus on relationships and self-concept; however, there is more emphasis placed on exposing these students to the general education setting and curricula. IDEA requires that there must be greater access to the general education curricula (with accommodations) and students with significant cognitive disabilities must make progress toward the educational expectations in the general education setting.

Elliott and Roach (2007) stressed that even though students with significant disabilities have a right to access the general education curriculum (i.e. science, mathematics, reading, and language arts), the students still need instruction and curricula that focuses on communication skills and basic living skills (functional, daily living skills). Although students with significant cognitive disabilities retain the right to an educational program (as outlined in their Individual Education Programs) that addresses their individual needs, federal legislations now makes the ultimate goal for these students to make progress and be proficient in the core content areas (science, language arts, reading, and mathematics) regardless of their disability (Elliott & Roach, 2007).

While a few states still teach students with a functional, one-size-fits-all or very low level academic curricula similar to the infant/early childhood curricula of the past, most states are moving away from those types of curricula (Quenemoen, 2008). There is still a struggle to design assessments and curricula that are more academically challenging, especially for those students with significant cognitive disabilities that are at the presymbolic level of communication. Researchers at the University North Carolina Charlotte (UNCC) investigated assessment and instructional issues for the population of

students with significant cognitive disabilities and are finding that these students can learn challenging academic content; however, the researchers note that the initial standards and descriptions will need to be carefully monitored and adjusted over time based on students' needs. Browder et al. (2003) observed that the focus on alternate assessments should still be on functional skills assessed in real-world environments, especially for students being instructed with modified curricula; however, Florida is making a shift in the curricula and instruction to match the content of the Florida Alternate Assessment (Browder et al., 2004).

According to Quenemoen (2008), age-appropriate, functional curricula have resulted in students with significant cognitive disabilities being able to demonstrate knowledge and skills that were previous not thought possible. In the 1990s, new best practices in teaching students with significant cognitive disabilities brought about new practices for student learning. Collins et al. (2000) noted that students with significant cognitive disabilities can benefit from curricula that still include instruction in functional skills in order to help with their transition into life after high school (i.e. post school outcomes).

As stated by Witzel and Riccomini (2007), the equal access and progress in the general education curriculum that are requirements of IDEA and the levels of performance that are stipulated in NCLB can create challenges for students with significant cognitive disabilities. The teachers responsible for providing services and program to students with disabilities also find these requirements of IDEA and NCLB problematic. One academic area of particular concern for educators and students is

mathematics. It has been shown that there is a need to develop more effective and efficient mathematics instructional curricula, materials, and procedures for low performing students with and without disabilities. In 2003, the National Assessment of Educational Progress reported that 23% of fourth graders and 32% of eighth graders scored below the basic level in mathematics.

Allsopp, Lovin, Green, and Savage-Davis (2003) believed that educators, administrators, and assessment developers need to understand why students are having difficulty learning mathematics. If researchers and educators can determine why, then effective instructional strategies can be implemented and assessments can be developed to determine what impact, if any, these strategies have on students' understanding of mathematical concepts. However, there are sources of difficulty in determining the reasons for students' difficulties with mathematics concepts. One source of this difficulty may be that some students have one or more learning disabilities that prevent them from learning the mathematical concepts as efficiently as those students without learning disabilities. With IDEA (1997) and NCLB (2001) placing so much emphasis on the performance of all students, including students with significant cognitive disabilities, educators are realizing how difficult it is for these students to learn mathematics (Witzel & Riccomini, 2007).

In response to the need for students with disabilities to perform on alternate assessments and to show learning gains as well as adequate yearly progress, educators, administrators, school districts, and state departments of education are reexamining the mathematics curricula being utilized with students with disabilities who participate in

alternate assessments. They are also beginning to align mathematics curriculum materials with their state's mathematics standards (Witzel & Riccomini, 2007). One tool that was introduced to teachers was the utilization of a pacing guide. School districts and administrators were emphasizing the use of the pacing guides to maximize teachers' effectiveness of teaching mathematics.

Witzel and Riccomini (2007) explained that the introduction of the pacing guide made educators realize how much additional time that students with disabilities need to acquire a mathematics concept or skill. With the pacing guide, teachers may be directed to deemphasize or skip important precursor skills that are necessary for students to acquire in order to learn critical concepts in the future. Using the pacing guide often required teachers to reteach mathematics standards that were covered in previous grades. Teachers had to spend time examining the mathematics curriculum being used for its sequence to determine if it was appropriate for their students. Due to the amount of time the pacing guide required from teachers, it was not the most effective mathematics strategy being used with students with significant cognitive disabilities.

Modifying general education mathematics curricula was another strategy that was introduced in an effort to help students with significant cognitive disabilities show learning gains on alternate assessments. This strategy gave teachers the labor-intensive task and responsibility of modifying existing curricula (Witzel & Riccomini, 2007). The modifications had to be done in order to meet the needs of students with disabilities and in order for teachers to be able to effectively and adequately teach all the common mathematics standards (not alternate achievement standards). Witzel and Riccomini

(2007) further discussed that neither of these strategies (the pacing guide or textbook modification) were truly effective so those making decisions in education, especially the education of students with significant cognitive disabilities. Researchers needed to conduct investigations to find the best strategies to deliver mathematics curricula to students with disabilities.

As previously noted, when researching effective strategies to teach mathematics to students with significant cognitive disabilities, it is important to first understand why these students are having difficulty learning mathematics skills and concepts (Allsopp et al., 2003). The growing research base has provides educators with a good foundation for teaching mathematics to students with significant cognitive disabilities and students are actually learning the skills being taught. Some of these strategies include: (a) ensuring that the sequence of instruction moves from a concrete representation to the abstract, (b) using direct modeling for both specific learning strategies using multisensory techniques and general problem-solving strategies, (c) providing students the opportunity to use their own language or form of communication to describe what they understand about the mathematical skill/concept, (d) teaching students in meaningful and authentic contexts, (e) giving students multiple practice opportunities so students can building proficiency and use their developing mathematical knowledge, and monitoring students' performance continuously and offering meaningful feedback. Allsopp et al. (2003) found that these strategies are effective because each one incorporates teaching strategies that accommodate the individual needs and learning characteristics of students with significant cognitive disabilities.

Research shows that when teaching students with significant cognitive disabilities, educators need to use multiple sensory inputs during mathematics instruction. They must also remember that these students do not all have the same learning styles or levels of cognitive abilities (Allsopp et al., 2003). Effective instructional practices need to be systematically implemented in classrooms and within mathematics instruction. Educators need to empower students when they are learning mathematics. Students with significant cognitive disabilities need to feel successful and confident when engaging and exploring in mathematical skills and concepts.

The National Council of Teachers of Mathematics (2007) cited six aspects of instruction have been studied in depth. These aspects of instruction are: (a) systematic and explicit instruction, (b) structured peer-assisted learning activities that involve groupings of varying ability levels, (c) graphic and visual depictions of mathematic problems, (d) student think-alouds and (e) formative assessment data given to teachers and students. In addition to these aspects of instruction, there are several important teaching practices suggested in a small body of instructional research. One of the teaching practices for students with significant disabilities include structured learning activities that use peer assistance in addition to explicit and systematic instruction involving extensive use of visual representations.

Mathematics instruction for student with significant cognitive disabilities should be in small groups of no more than six students if possible (National Council of Teachers of Mathematics, 2007). The instruction should again be systematic and explicit, address the necessary skills for that particular unit, require the students to use graphic

representation to work through problem-solving options, and require the student to think aloud as he or she solves a mathematic problem. The research further suggests that depending on the grade level, the curricula should balance work on rational-number or whole-number operations with specific strategies for solving those problems that are more complex.

When evaluating intervention programs and/or mathematics curricula for use with students with disabilities, all of these criteria should be considered. Witzel and Riccomini (2007) reported that due to the accountability mandates in NCLB and IDEA and the poor mathematics performance of students with significant cognitive disabilities, school districts are implementing a variety of preventive strategies in an effort to increase mathematics achievement. These preventive strategies include effectively using manipulatives and technology, emphasizing early mathematical thinking, providing afterschool tutoring programs and/or remediation, improving diagnostic assessment options, increasing parental involvement, and carefully evaluating new mathematics curricula prior to implementation.

Allsopp et al. (2003) commented that the Equity Principle found in *Principles and Standards for School Mathematics* notes that mathematics can and must be learned by all students including students with significant cognitive disabilities. This principle is more difficult to put into practice than it is to establish in the abstract. Witzel and Riccomini (2007) suggested that one explanation for this and the poor mathematical performance of students with significant cognitive disabilities that is compelling and often overlooked is

the impact that mathematics curricula and instructional materials have on students' mathematical performance in the classroom and on alternate assessments.

School districts throughout the country are trying to find ways to effectively teach mathematics to students with significant cognitive disabilities who participate in alternate assessments. One way school districts are doing this by implementing the Equals mathematics curriculum for mathematics instruction for students who are eligible for and participating in the Florida Alternate Assessment. As cited in the Equals Mathematics Alignment to Common Core Standards (n.d.), the Equals chapters, sections and objectives have an established connection with the Common Core Standards (CCS). This connection includes the specific grade level, each state's identification number and the description of the common core state standard. Webster (n.d.) contended that one of the strengths of this mathematics curriculum program is that it reflects the mathematics concepts that most states in the United States cover in their state standards.

Meyer, Ross-Brown, and Satterfield (n.d.) observed that Equals is a research-based mathematics curriculum. The design of this curriculum is such that it enables success for every student with disabilities. According to Webster (n.d.), it is a curriculum that is specifically designed for students with multiple varying disabilities (i.e. from mild disabilities to severe/profound disabilities). This program is designed for students of all skill sets in the process of learning mathematics (Meyer et al., n.d.). The Equals mathematics curriculum helps students with varying levels of disabilities develop an understanding and strong foundation of pre-math and readiness math, algebra, geometry, numbers and operations, data analysis and probability and measurement. This curriculum

assists students with severe disabilities acquire a basic level of mathematics literacy even though they may not possess the same level of skills. (Webster, n.d.). It also teaches higher level concepts to those students with disabilities who have higher reasoning skills and understanding of mathematics concepts.

The Equals curriculum has assessments that can be used as pre- and post-assessment (Satterfield & Ross-Brown, 2013). When used as pre-assessments, the information can identify which chapter/lesson the student should begin instruction. Student growth can be identified when used as post-assessments. There are six subtests that are used with the curriculum. These subtests are (in order of complexity): (1) Attending and Exploring, (2) Data Analysis and Probability, (3) Algebra, (4) Geometry, (5) Measurement, and (6) Numbers and Operations. There are specific instructions on adapting each subtest (questions and responses). These adaptations are noted and the raw score is adjusted accordingly.

The curriculum is 12 chapters and ascends from basic mathematics concepts such as “attending” to more difficult concepts such as fractions and geometry. It also incorporates functional math skills with are important for students with significant cognitive disabilities (Webster, n.d.). Meyer et al. (n.d.) and Webster (n.d.) explained that each lesson in the curriculum begins with a warm-up activity and is then divided into three ability levels for instruction and materials so that the mathematical concepts are accessible and meaningful for students with disabilities (i.e. Level 1 is designed for students with severe/profound disabilities, Level 2 is designed for students with moderate disabilities, and Level 3 is designed for students with mild disabilities). Webster (n.d.)

noted that the warm-up is followed by an Introduce and Connect in each lesson that builds on prior knowledge. Then there is a Teach, Problem Solving, and Close. All aspects of the lesson provides for each of the three levels. The curriculum also includes problem solving, games, and work stations (learning centers).

Since research has shown that manipulatives are an important part of mathematics instruction for students with disabilities, Equals provides a complete set of curricular materials that have been specialized for each lesson. The set includes items such as counting blocks, posters, mathematics vocabulary cards and graphic organizers, measuring devices, and many other manipulatives and mathematics tools (Meyer et al., n.d.). Webster (n.d.) indicated that these manipulatives provide a good alternative to paper and pencil activities. They also accommodate a variety of response methods (i.e. students can place counters on a chart or use eye gaze to identify correct responses). By using a hands-on, multi-sensory approach, the curriculum ensures that students understand the underpinnings of mathematical concepts and concrete realities (Meyer et al., n.d.).

According to Meyer et al. (n.d.), the Equals mathematics curriculum is based on extensive research in mathematics education, cognitive science, and recommendations of professional organizations. The Equals mathematics curriculum is linked to the core content standards in all fifty states. Additionally, Ablenet connected the chapters, sections and objectives of the Equals curriculum with the common core standards (CCS) that have been adopted by Florida, as well as other states. Ablenet further connects the curriculum to Florida's Access Points (alternate achievement standards – AAS). Within

the curriculum's scope and sequence, the grade level, state identification number and CCS descriptions are specifically stated so they can be included in lesson planning, grading systems, etc.

The Equals mathematics curriculum exhibits an understanding of what students with significant cognitive disabilities actually need in order to become mathematically capable, proficient, and product adults (Meyer et al., n.d.). It is the goal that after participating in this curriculum, this student population will be able to understand and distinguish a variety of number representations and be able to use them in a variety of academic and real-life conditions. By developing flexible mathematical skills, students learn the meanings and justifications of mathematical procedures. By having this knowledge, students with significant cognitive disabilities will be able to apply the mathematical procedures they have learned to an extensive range of situations of problems. They are able to learn the mathematical processes of communication effectively with mathematics, reasoning and proof, and connecting mathematics skills to new math learning as well as real life situations.

CHAPTER 3 METHODOLOGY

Introduction

The purpose of this study was to examine if the use of the Equals mathematics curriculum would have a statistically significant difference on the 2012 Florida Alternate Assessment mathematics scores (specifically the proficiency levels) of students with disabilities in Central Florida School Districts A, C, D, E, F and East Coast Florida School District B (treatment group) as compared to students with disabilities in North Florida School District G, South Florida School District H, East Coast Florida School District I, and Central Florida School Districts J, K, and L (control group). This study further examined the perceptions of and attitudes about the Equals mathematics curriculum that exist among ESE teachers who teach mathematics to students with disabilities who participate in the Florida Alternate Assessment.

This study examined the Equals mathematics curriculum being used in Central Florida School District A, as well as other Florida school districts, for any possible statistically significant difference in the number of students with disabilities scoring Level 4 or higher (showing proficiency) in mathematics as measured by their Florida Alternate Assessment mathematics scores. This will allow central office administrators in school districts to make determinations regarding the continued use of this specific mathematics curriculum, which is accompanied by expenses related to professional development, mentoring/coaching, color copying, and the purchase of additional curriculum kits and manipulatives. This chapter is organized by the following sections:

Population Demographics, Research Design, Measures, Procedures, Data Analysis, and Summary.

Selection of Participants

For the quantitative portion of the study, the target population was represented through a convenience sample of ESE students with significant cognitive disabilities in grades 3-12 attending school in various Florida school districts who participated in the 2012 administration of the Florida Alternate Assessment (FAA). The treatment group (students educated through the Equals curriculum) consisted of students from Central Florida School Districts A, C, D, E, F and East Coast Florida School District B ($n = 6$); the control group (students not educated through the Equals curriculum) consisted of students from North Florida School District G, South Florida School District H, East Coast Florida School District I, and Central Florida School Districts J, K, and L ($n = 6$). Using the criteria outlined in Rule 6A-1.0943, FAC, IEP teams are responsible for determining the eligibility of students to be assessed with the Florida Alternate Assessment (“Florida Alternate Assessment,” n.d.). All the students in this study population have disabilities and had been determined eligible to participate in the Florida Alternate Assessment by meeting all five statements found on the students’ IEP in the Alternate Assessment section (Denbroeder, 2008). Students were not intentionally found eligible to take the Florida Alternate Assessment for purposes of this study; they were eligible prior to the study based on the criteria in Rule 6A-1.0943, FAC.

For the qualitative portion of the study, ESE teachers in the treatment counties (Central Florida School Districts A, C, D, E, F and East Coast Florida School District B) were selected ($n = 957$) based on their ESE teacher-based job title listed on the individual schools' websites. When the survey link was e-mailed, it was unknown as to whether each recipient was an ESE teacher who taught mathematics to students who participate in the Florida Alternate Assessment (FAA). However, the first question of the survey qualified a teacher to move on through the survey by answering "yes" they taught mathematics to students who participate in the FAA.

Instrumentation

Florida Alternate Assessment

The Florida Alternate Assessment (FAA) is the alternate assessment that was developed for Florida to assess students with significant cognitive disabilities that are unable to be assessed with the Florida Comprehensive Assessment Test (FCAT) ("Florida Alternate Assessment," n.d.). Validity must be taken into consideration when using standardized assessments. A framework for sources of evidence when examining validity of an assessment can be found in the *Standards for Educational and Psychological Testing* (Office of Measured Progress, 2010). One area that the framework considers is test content.

According to the Office of Measured Progress (2010), one way to measure content validity of an assessment is to determine how well the assessment questions

represent the core content area (mathematics for purposes of this study) and the standards for that content area for the grade being assessed. The Florida Alternate Assessment is based on the Sunshine State Standards Access Points (alternate achievement standards) in mathematics (“Florida Alternate Assessment”, n.d.). The test questions of the FAA are aligned to these Access Points and undergo multiple reviews for content appropriateness and fidelity (Office of Measured Progress, 2010). Additionally, state-mandated test administration procedures have been standardized and teachers are trained annually in order to maximize the consistency of not only the test administration but also scoring of test questions. All these are evidence of validity based on test content.

There are nine performance levels on the Florida Alternate Assessment. These are *Emergent* (levels 1-3), *Achieved* (levels 4-6), and *Commended* (levels 7-9) (“Facts about,” n.d.). *Emergent* indicates that from instruction and practice, the student has developed basic knowledge of specific academic skills but may need prompting or cueing. *Achieved* indicates that the student can demonstrate acquisition of specific academic skills learned through practice and classroom instruction. *Commended* indicates that the student has mastered and is able to generalize the academic skills learned from classroom instruction and practice.

There are three levels of complexity on the Florida Alternate Assessment. Those levels are *Participatory* (least complex), *Supported*, and *Independent* (most complex). The *Participatory* level concentrates on skills that are at the beginning stages of academic awareness, such as recognizing a number, letter, or parts of a whole. The *Supported* level assesses skills that require performing basic academic abilities, such as solving simple

math problems, reading words, or identifying and recalling. Finally, the *Independent* level requires the student to be able to organize, analyze, and compare, such as in identifying the main idea of a story or solving more complex math problems (“Facts about,” n.d.).

All the test items were initially developed by the staff of Measured Progress Curriculum and Assessment (Office of Measured Progress, 2010). There was a lead developer assigned to the content area of mathematics (and the other content areas) who was responsible for the oversight of the development of the test items. After being reviewed by the lead developer assigned to mathematics, a special education specialist then reviewed the test items. It was then the responsibility of the curriculum and assessment developer to ensure that the test items remained true to the content of the mathematics Access Points it was designed to assess. Materials required and accessibility of the test items were also reviewed to ensure appropriateness for students with significant cognitive disabilities (Office of Measured Progress, 2010).

Each core content area contains 16 items, each of which contains three questions (one at the *Participatory* level, one at the *Supported* level, and one at the *Independent* level). Students start at the *Participatory* level and if they answer that question correctly, they move on to the next level with the opportunity to answer questions at all three levels (“Facts about,” n.d.). Students are able to earn one, two, or three points at the *Participatory* level; six points at the *Supported* level; or nine points at the *Independent* level. Therefore, a student can earn a maximum total of nine points per item. Students who refuse to participate receive a score of zero. The maximum number of points that

can be earned in each core content area is 144. Table 1 contains the raw scores on the FAA by grade and performance level. If a student's raw score (58-144 for grades 3-12) places them in the *Achieved* or *Commended* performance levels, then they are considered to be proficient in that content area.

Table 1

Mathematics Florida Alternate Assessment Raw Scores and Performance Levels

Grade	Performance Levels**								
	1	2	3	4	5	6	7	8	9
3	0-22	23-38	39-57	58-70	71-86	87-98	99-110	111-125	126-144
4	0-22	23-41	42-57	58-69	70-86	87-98	99-110	111-126	127-144
5	0-24	25-39	40-57	58-72	73-86	87-98	99-110	111-123	124-144
6	0-25	26-38	39-57	58-71	72-87	88-98	99-111	111-126	127-144
7	0-25	26-40	41-57	58-69	70-86	87-98	99-110	111-126	127-144
8	0-26	27-40	41-57	58-69	70-85	86-98	99-110	111-126	127-144
9	0-23	24-41	42-57	58-70	71-90	91-98	99-107	108-130	131-144
10	0-28	29-44	45-57	58-69	70-91	92-98	99-108	109-129	130-144

Note. Grades 11 and 12 not included; most students taking the FAA in these grades are make-ups. (Palm Beach County Schools, 2013)

**Levels 4-9 are considered to be proficient

Reliability of the Florida Alternate Assessment is important due to the multiple accountability levels of the scores of the FAA, including the accountability of proficiency levels mandated by No Child Left Behind (Office of Measured Progress, 2010). When examining the reliability of the Florida Alternate Assessment, the consistency and accuracy of the classification of students into their performance level categories (i.e. Emergent, Achieved, Commended) is an issue that is even more important in a framework that is based on standards-based reporting. Cronbach's α was used to assess the reliability of the Florida Alternate Assessment (Office of Measured Progress, 2010); however, statistics are only reported for subgroups that consisted of more than ten students. Due to the small sizes of the subgroups of the population participating in the Florida Alternate Assessment, an industry standard for interpreting the reliability coefficient is nonexistent. Therefore, decision accuracy and consistency (DAC) is most often calculated using the data from alternate assessments. The Office of Measured Progress (2010) noted that when using DAC statistics to determine assessment reliability, the levels will be lower due to the small group size and without DAC statistics, there are no guidelines for determining the strength of score values of alternate assessments.

Teacher Online Survey

Qualitative data were collected through an online survey intended to obtain the perceptions of, and attitudes about, the Equals mathematics curriculum. Specifically, the survey explored topics related to teacher utilization of the Equals curriculum (if they

utilized it, and if so, how), the frequency with which teachers utilized the curriculum, and their perceived effectiveness of the curriculum. In addition, the survey collected basic demographic information about the teachers who provide mathematics instruction to students with disabilities who participate in the Florida Alternate Assessment, including certification and endorsement information, number of years teaching mathematics to students participating in alternate assessment, grade taught, and highest college degree earned.

Suggestions made by the CEO of AbleNet and an AbleNet curriculum writer were taken into consideration when the questions were composed for the survey. Four of the ten questions were two-part questions, bringing the survey to a total of 14 questions. There were eight structured questions, in the form of yes-or-no, Likert scale, and multiple choice. There were also four semi-structured questions (guided open-response), and 2 unstructured questions (open free-response). The survey questions are located in Appendix B.

Data Collection

This study utilized a mixed methods mode of research to include both quantitative and qualitative research. The quantitative portion of the study was conducted using archival data obtained from the 2012 Florida Alternate Assessment Data Book (FLDOE, 2013). Only the mathematics scores were examined in accordance with the focus of the current study. The data were readily available for collection on the Florida Department of Education Exceptional Student Education website. The effect of the use of the

mathematics curriculum was observed in a post-hoc fashion (Krathwohl, 2009).

Implementation of the Equals mathematics curriculum was not treated in an experimental fashion, as the treatment school districts already possessed the curriculum and had implemented it prior to the beginning of the current study. The data in this study are reliable since the students' mathematics scores are all calculated using the same method regardless of grade, student ability level, school district, or curriculum utilized.

However, as noted by Krathwohl (2009), the design of the current study can face the issue of having difficulty in retrospectively establishing precedence of a cause of differences in mathematics performance for reasons other than implementation of the Equals mathematics curriculum. This can also create the potential of other unexplained variables being the cause of differences.

Since the study began by having one school district serve as the treatment group and one school district serve as the control group, the first step in the study was to obtain consent from both Central Florida School District A's (treatment group) and Central Florida School District L's (control group) superintendents. This consent was necessary in order to obtain the 2012 Florida Alternate Assessment mathematics scores for students in these respective districts. Nevertheless, Central Florida School District L's approval letter was very specific in stating that all data would have to be obtained from the Florida Department of Education.

A request for approval of conducting this study was submitted to the University of Central Florida Institutional Review Board (IRB), Office of Research and Commercialization. On September 17, 2012, the UCF Institutional Review Board #1

notified the researcher that the IRB approved this study as human participant research that is exempt from regulation (Appendix C). When the qualitative portion of the study, the online survey, was added, the researcher contacted the university's Institutional Review Board office via telephone. The researcher was informed that the letter of approval dated September 17, 2012 was still sufficient since the online survey was anonymous and the teachers and school districts could not be identified based on the survey responses. The researcher was further advised at that time to close the study through IRB. The amendment to the study (online survey) was added through the IRB website and the request to close the study was completed. On June 14, 2013, the Acknowledgement of Study Closure (Appendix D) was received.

The Florida Department of Education Exceptional Student Education (ESE) Department was contacted in an effort to obtain the following variables for students with disabilities who participated in the 2012 administration of the FAA: (a) gender, (b) primary exceptionality, (c) specific numerical score (1-144), and (d) specific performance level (1-9). Although a staff member at the Florida Department of Education stated that she would provide the researcher with this data, the official e-mail from the researcher to the Florida DOE was met with an automated response stating that this staff member was no longer employed. After contacting her supervisor, the researcher was advised that the requisition process for data had changed and a Florida Department of Education Unit Record Data Request would have to be submitted to receive data.

The formal request was completed and submitted prior to the mandated review date of February 1, 2013, one of three acceptance dates in 2013 for new proposals. After

the required 4-week review period, the Department's research coordinator notified the researcher via e-mail that the data request was denied by the program office because of an impending replacement of the FAA with the Common Core assessment for students on alternate standards in 2012 through 2015. Nevertheless, she asked if the Equals mathematics curriculum related to the Common Core assessment, techniques, or standards. The researcher responded via e-mail in the affirmative and attached documentation that illustrated the specific standards aligned with each chapter and lesson of the curriculum at each grade level, elementary through high school. In an e-mail dated April 16, 2013, the research coordinator stated that she was still attempting to obtain the data needed for the current study.

Based on the time constraints imposed by the aforementioned message, the researcher decided to utilize the 2012 Florida Alternate Assessment Data Book available on the Florida Department of Education's ESE website to gather quantitative data for the study. As shown in Tables 2 and 3, the following data were extracted from this data book and used for the quantitative portion of the study (for both treatment and control groups): total percentage of students in the school districts who scored a Level 4 or higher (proficient) on the FAA. As previously noted, students scoring a Levels 4-6 are considered to be at the *Achieved* level and students scoring Levels 7-9 are considered to be at the *Commended* level (both of which are considered to show proficiency). The data was broken down by individual grade levels (grades 3, 4, 5, 6, 7, and 8), high school grade levels (grades 9-12), and all grade levels participating in the FAA (grades 3-12).

In order to establish additional school districts to be part of the study as members of the treatment and control groups (beyond the two districts originally intended to be a part of the research), the researcher contacted the Ablenet Equals Florida sales representative by phone and e-mail. The representative identified six school districts in Florida that have purchased the Equals curriculum to utilize with students with disabilities who participate in the FAA. Those six school districts (identified as school districts A-F) were determined to be the treatment group. The sales representative further confirmed six different school districts similar in size to the treatment school districts that had not purchased the Equals curriculum; therefore, those six school districts (identified as school districts G-L) were determined to be the control group. The quantitative data noted in Tables 2 and 3 were gathered for the six treatment school districts (A-F) and for the six control school districts (G-L) to be analyzed for the presence of any statistically significant difference of the 2012 FAA mathematics scores of students in the treatment group.

Table 2

Percentages of Students with Disabilities in Grades 3-12 in the Treatment School Districts Scoring Level 4 or Higher on the Mathematics Portion of the 2012 Florida Alternate Assessment (n=6)

Grade	School Districts					
	A	B	C	D	E	F
3	63	71	71	46	67	66
4	64	73	70	61	66	66
5	56	74	66	53	68	71
6	67	63	68	43	67	76
7	72	67	65	58	60	83
8	70	68	70	64	66	81
9-12	59	76	70	57	60	80
3-12	65	71	69	55	64	77

Note. In the 2011-12 school year, districts A, E, and F were classified as large, while districts B, C, and D were classified as very large. (Florida Department of Education, 2013, pp. 24-36)

Table 3

Percentages of Students with Disabilities in Grades 3-12 in the Control School Districts Scoring Level 4 or Higher on the Mathematics Portion of the 2012 Florida Alternate Assessment (n=6)

Grade	School Districts					
	G	H	I	J	K	L
3	65	69	58	44	59	58
4	67	71	73	68	66	87
5	67	69	66	45	70	58
6	54	59	67	51	67	59
7	57	65	75	62	73	70
8	60	63	71	59	76	60
9-12	65	61	65	69	72	66
3-12	63	65	67	58	70	64

Note. In the 2011-12 school year, districts I, J, K, and L were classified as large, while districts G and H were classified as very large. (Florida Department of Education, 2013, pp. 24-36)

To further research the Equals mathematics curriculum, specifically the perceptions of and attitudes about the curriculum by ESE teachers, a qualitative research question was added to the study. The qualitative method of data collection utilized a teacher survey delivered through Survey-Monkey. Survey Question 1 was designed to be answered by all the ESE teachers who received the survey link via e-mail and served as a

screening question to determine whether the teacher taught mathematics to ESE students who were taking the FAA. If the teacher answered affirmatively, he or she was subsequently directed to complete the rest of the survey. If the teacher answered negatively, the respondent was thanked for his or her time and allowed to exit the survey. The survey opened on April 27, 2013 and was set up to close on May 10, 2013.

In order to obtain individual e-mail addresses for the ESE teachers, who served as the target population for the survey, the researcher visited the website of each treatment school district to find the individual website for each school. Some school websites did not list the job title of their teachers, which prevented contact to staff members at these schools. Other schools identified teachers only as ESE teachers but did not specify what subpopulation they taught, while some schools were specific as to what ESE population the teachers taught (e.g., Autism, Intellectual Disabilities, Varying Exceptionalities, etc.). Because of these inconsistencies, the researcher gathered the e-mail addresses for all the ESE teachers (specific or non-specific) in five of the six treatment school districts. One school district did not provide any e-mail addresses.

Each teacher received a personable e-mail from the researcher, who introduced herself as an ESE teacher and also as a mother of a child with a disability who is being educated by Florida's ESE program. The researcher did not identify any school district affiliation, either current or former. Recipients were informed that they were receiving a survey link because according to their schools' websites, they were identified as an ESE teacher in a school district that utilized the Equals mathematics curriculum. Confidentiality and anonymity of responses were assured, as well as their school district

membership. Recipients were further advised that no school district identification whatsoever would be disclosed in the study. Finally, recipients were thanked in advance for taking the time to complete the survey. A survey link was provided in each message.

The initial e-mail was sent to 1,017 ESE teachers; however, 60 messages were returned due to various reasons, the largest of which was that the message was undeliverable to the address. Therefore, the survey link was presumed to be received by 957 ESE teachers. Teachers received a reminder message on May 5, 2013, one week after the initial e-mail was sent. The reminder message thanked those who had already completed the survey and reminded them of the closing date of the survey. This reminder also reiterated that their responses would help to provide results that would attempt to improve mathematics instruction for students with disabilities in Florida, as well as their mathematics scores on the Florida Alternate Assessment.

Data Analysis

Quantitative

A Mann-Whitney *U* Test was conducted through SPSS to analyze the data for this quantitative portion of the study. This test was selected due to the structure and small size of the limited quantitative data that were obtained. It was used to test Research Question 1 regarding the effectiveness of the Equals curriculum, in which the two samples (treatment and control group) came from the same population. The Mann-Whitney *U* Test was run to assess the presence of any statistically significant relative

differences in percentages of students who scored Level 4 or higher (proficient) between the control and treatment groups among students at four respective levels: (a) elementary, grades 3-5; (b) middle, grades 6-8; (c) high, grades 9-12; and (d), overall, grades 3-12. The statistical test utilized a significance level of $\alpha = .05$ and a 2-tailed hypothesis. Descriptive statistics were run as well as the mean ranks, Z-score and *p*-value.

Qualitative

Once the survey closed on May 10, 2013, the results were analyzed through the researcher's manual coding and assisted by the summary tables and charts available through Survey-Monkey. Additional analysis was conducted to explore differences and similarities among survey question responses. Common terms and themes were noted and compared. Answers to specific questions were compared to those of other questions in an attempt to determine if any relationships exist. Tables were created so these relationships could be examined. Relationships between the numbers of days the Equals curriculum was utilized and the perceived effectiveness of the program were also examined. In addition, teachers' perceptions of the effectiveness of the Equals curriculum were compared to the number of pre-assessment subtests that were completed.

Survey Questions 2 and 3, which addressed what grade level the teacher taught and what type of training the teacher and paraprofessional received for the Equals curriculum, were specifically coded so the frequencies of teachers responding to each choice could be tabulated. Data triangulation was used by surveying teachers from five

of the six treatment counties. This promoted generalizability if the study is replicated, since the treatment counties train and utilize the curriculum in different manners.

Summary

This chapter restated the purpose of the current study and discussed how the research questions were tested. The data collection procedures were described, including the use of quantitative data obtained from archival data using convenience sampling. The quantitative data addressed the population of ESE students who took the Florida Alternate Assessment in 2012 in the school districts comprising the treatment group and the control group. Stratified random sampling was utilized for the survey (qualitative) portion of the study. The survey link was sent via e-mail only to teachers identified as serving the ESE population. The actual sample of teachers who were qualified to proceed with the survey was determined through the use of a yes-or-no screener question. Finally, the methods of analyzing the quantitative and qualitative data were discussed in this chapter. Results of the data analysis are presented in Chapter 4.

CHAPTER 4 DATA ANALYSIS

Introduction

This study set out to examine if there was any statistically significant difference in the Florida Alternate Assessment mathematics scores (specifically proficiency levels) of ESE students receiving mathematics instruction via the Equals curriculum (treatment group) versus those school districts that do not utilize the Equals curriculum (control group). The study also examined ESE teachers' perceptions of the Equals curriculum and their attitudes about this curriculum. This chapter presents the results of the quantitative data analysis as calculated through the use of the Mann-Whitney *U* Test. It also provides the results of the qualitative data obtained from analyzing the teacher survey results through a comparative contrast model. This chapter will address the quantitative research question followed by the qualitative research question.

Variables

Quantitative

The dependent variable in the study is the Florida Alternate Assessment mathematics scores. The independent variable is the use of the Equals mathematics curriculum. Due to the nature of the population of students with disabilities, there were extraneous variables involved in the study such as a change in placement (for example, moved from one program to another but still eligible to take the FAA) that could have

held some effect on the test scores. Such variables could serve as causal links to explaining increases or decreases in students' FAA scores in reading and mathematics. Other possible linked variables include student behavior on the day of testing, use or lack of assistive technology to answer the assessment questions, or medications being taken by the student, amongst others.

Descriptive Statistics

Student Achievement on Florida Alternate Assessment

The Florida Alternate Assessment 2012 Databook provided data on the percentage of students who scored a level 4 or higher on the mathematics section, which represents the score at which students demonstrate proficiency based on the skills assessed on the Florida Alternate Assessment. Table 4 provides the mean percentages and standard deviations for the district-wide proficiency rates of students with disabilities who participated in the 2012 FAA in both the treatment and control districts. Please note that the sampling unit for these data was at the district level. As indicated in Table 4, the mean proficiency percentages of the treatment school districts were higher than were in the control districts for all grades other than grade 4.

Table 4

Descriptive Statistics for the Percentage of Students Scoring Level 4 or Higher on the Florida Alternate Assessment for Treatment and Control Districts (N = 12)

Grade	Treatment Districts		Control Districts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
3-5 ^a	64.72	6.96	64.44	9.94
6-8 ^a	67.11	8.79	63.78	7.19
9-12	67.00	9.72	66.33	3.78

^aN = 18.

Data Analysis

Quantitative Analysis

A quantitative approach was taken to answer the first research question: *What statistically significant difference, if any, did the Equals mathematics curriculum have on the 2012 Florida Alternate Assessment mathematics scores of students with disabilities in the treatment group as compared to the mathematics scores of students with disabilities in the control group?* Specifically, the Mann-Whitney U Test was utilized.

The Mann-Whitney U Test compared the mean rankings of the percentages of students who scored level 4 or higher on the 2012 FAA between treatment and control groups. The test was calculated for four different grade groupings: elementary (3-5), middle (6-8), high (9-12), and all grades (3-12). Results for all four tests are provided in

Table 5. For all four tests, the analysis indicated no evidence of a statistically significant difference in mean ranks between the treatment and control groups for the percentages of students scoring at least level 4 on the FAA.

In the case of elementary and middle grades, respectively, the treatment groups yielded higher mean ranks ($M_r = 7.17$) than did the control group ($M_r = 5.83$), which indicated a tendency for greater performance in the treatment group. These results, however, were not statistically significant ($Z = -0.64, p = .59$). Nevertheless, the opposite result held true for the high school grades and all grade groupings. The control group schools yielded a higher mean rank for performance ($M_r = 6.67$) than did the treatment group schools ($M_r = 6.33$). Again, however, the results were not statistically significant ($Z = -0.16, p = .94$).

Table 5

Mann-Whitney Test Results, Percentage of Students Scoring Level 4 or Higher on 2012 Florida Alternate Assessment, Treatment versus Control (N = 12)

Grade Level	Mean Ranks		Z	p
	Treatment (n = 6)	Control (n = 6)		
Elementary (3-5)	7.17	5.83	-0.64	.59
Middle (6-8)	7.17	5.83	-0.64	.59
High (9-12)	6.33	6.67	-0.16	.94
Total (3-12)	6.33	6.67	-0.16	.94

* $p < .05$. ** $p < .01$.

Qualitative Analysis

A qualitative approach was taken to answer the second research question: *What perceptions of and attitudes about the Equals mathematics curriculum exist among Exceptional Student Education (ESE) teachers who teach mathematics to students with disabilities who participate in the Florida Alternate Assessment?* An anonymous online survey facilitated through Survey-Monkey solicited responses from ESE teachers as to their perceptions of and attitudes about the Equals mathematics curriculum.

As previously noted, the survey link was sent via e-mail to 957 teachers listed on their schools' websites as serving the ESE population. Of those 957 potential respondents, 240 teachers replied to the screener question designed to determine eligibility. Of the 240 responding teachers, 88 teachers answered affirmatively that they taught mathematics to students at their school sites who participate in the Florida Alternate Assessment, which qualified them to complete the rest of the survey. The remaining 152 answered the first question negatively and were subsequently instructed to not answer any other questions and exit the survey. Because the survey did not automatically lock these teachers out of the survey, responses to additional survey questions from these ineligible respondents were deleted so that the results of the survey would be accurate.

Demographic Qualities of Participants

The questionnaire asked teachers to provide various demographic qualities, including grade taught and level of highest education. Results for these two variables are provided in Table 6. A total of 35 teachers (40.2%) were teaching at the elementary level; an equal number of teachers were located at the high school level. Therefore, teachers were most likely to serve the youngest and oldest students, respectively. Regarding education, 43 teachers (48.8%) held a bachelor's degree of some sort, with another 40 teachers (45.5%) holding a master's degree. The remaining 5 teachers (5.5%) earned a doctoral degree. Overall, over half of the teacher respondents (55, 62.4%) held a highest degree in ESE. It should be noted that if a teacher marked two degrees of equal level, an ESE degree was counted instead of the other degree due to the focus of the current study.

Table 6

Demographic Qualities of Qualitative Participants, Grade Taught and Highest Education Level

Demographic	#	%
Grade Level Taught (<i>N</i> = 87)		
Elementary (K-5)	35	40.2
Middle (6-8)	17	19.5
High (9-12)	35	40.2
Highest Level of Education (<i>N</i> = 88)		
Bachelor, Education	3	3.4
Bachelor, Exceptional Student Education	25	28.4
Bachelor, Other Field	15	17.0
Master, Education	4	4.5
Master, Exceptional Student Education	29	33.0
Master, Other Field	7	8.0
Doctorate, Education	0	0.0
Doctorate, Exceptional Student Education	1	1.0
Doctorate, Other Field	4	4.5

Teachers were also asked about the certifications and endorsements they have received; results are located in Table 7. Nearly all respondents (85, 98.8%) held a general ESE K-12 certification; additionally, over half (48, 55.8%) hold elementary education certifications. In all, 58 teachers possess multiple certifications. Regarding additional endorsements, the most frequently found selection was for English as a Second Language (ESOL), with 31 respondents (64.6%) holding it in this area. Autism Spectrum Disorder (ASD), was also cited as a frequent endorsement with 16 teachers (33.3%)

claiming an endorsement in this area. Overall, 20 teachers claimed multiple endorsements.

Table 7

Demographic Qualities of Qualitative Participants, Certifications and Endorsements

Demographic	#	%
Certifications (<i>N</i> = 86)		
ESE, K-12	85	98.8
Hearing Impaired, K-12	1	1.2
Speech Impaired, K-12	0	0
Visually Impaired, K-12	1	1.2
Early Childhood Education	6	7
Elementary Education	48	55.8
Middle Grades Mathematics	5	5.8
Middle Grades Integrated	7	8.1
Secondary Mathematics	2	2.3
Other ^a	10	11.6
Endorsements (<i>N</i> = 49)		
Autism Spectrum Disorder (ASD)	16	33.3
Specific Learning Disabled (SLD)	3	6.3
English as a Second Language (ESOL)	31	64.6
Severe/Profound Disabilities (SPD)	7	14.6
Emotionally Handicapped (EH)	1	2.1
Physically Handicapped (PH)	1	2.1
Varying Exceptionalities (VE)	4	8.3
Mental Retardation (MR)	1	2.1
Other ^b	15	31.3

Note. Percentages add up to more than 100% as multiple selections could be made.

^aIncludes Physical Education, Health, Political Science, Music, Social Science, Biology, Social Studies, Administration.

^bIncludes Reading, Early Childhood, and Pre-K.

When the survey results were analyzed, 22 of the 88 teachers cited that they did not use the Equals mathematics curriculum because it was not the mathematics

curriculum used at their school site with students who participate in the Florida Alternate Assessment. Therefore, the remaining results will be based on the 66 qualified teachers that either have access to or use the Equals curriculum. These results will pertain to survey questions 2-8.

Equals Curriculum Kits

Teachers were asked about their possession and use of the Equals curriculum kits, including the manipulatives that accompany the kit (N=50). Forty-one teachers (82.0%) reported that they have their own kits to use for instruction, but two (4.88%) of these forty-one teachers indicated that even though they have their own kits, the kits are missing pieces. Not all teachers have their own kits, however. Eight teachers (16.0%) claimed they had to share a kit among anywhere from two to six teachers; one of these teachers indicated occasional sharing of the kit. Finally, one teacher (2.0%) indicated that he or she did not have a kit.

Training

Another area of interest explored by the survey pertained to teacher training of the Equals mathematics curriculum. Out of the 65 respondents (N=65) who answered the pertinent question, 29 (44.6%) indicated they received training from an Equals representative. Three of these teachers specified that their training was in a single-day workshop format. Another 18 teachers (27.7%) indicated they received their training from district personnel in a structured workshop. Four of these teachers specified that

their training was in a single-day workshop format, while another four teachers specified that their training was condensed into a half-day workshop. Six teachers (9.2%) indicated they received training from another teacher, while five teachers (7.7%) indicated they were trained but did not specify the training source. Some self-teaching occurred as well; one teacher (1.5%) noted the use of a tutorial video for training and three teachers (4.6%) indicated another self-taught method of training. Three teachers (4.6%) indicated they did not receive any training at all. Teachers were also asked about the training of their paraprofessionals; 19 (29.2%) noted that the paraprofessionals did not receive any type of training, but 8 teachers (12.3%) said that they trained their paraprofessionals themselves.

There were 11 teachers (16.9%) who felt that the training they received was not adequate. Several teachers provided specific comments regarding the training they received. One teacher stated, “I did not feel the training AT ALL prepared me for implementing the program as designed.” Another teacher reported that the training was “not the best” and that there should have been videos showing the curriculum actually being used with a student or group of students. One response received was that the training with the Equals representative would not have been enough if that teacher had not had previous experience teaching mathematics. Two teachers stated that most of their training day was spent taking apart and sorting the curriculum cards (cards used in subtests and lessons).

However, another 11 teachers (16.9%) felt the training was adequate and some stated the training was “good”. One teacher stated that he or she had many “ah ha

moments” after attending the training. Another teacher stated, “One of the best trainings I have been to. It was very helpful.” An additional common theme of training that was discussed by teachers was the follow-up training or guidance provided by their school districts. Two teachers stated that they received some type of follow-up from district personnel, but ten teachers stated that they did not receive any type of follow-up.

Use of Subtests and Curriculum

Teachers were asked about their use of the subtests as pre-assessments to determine where in the curriculum the students need to begin instruction. Seven teachers commented specifically about the Equals subtests. Several of these teachers stated that the subtests were too long or otherwise expressed the feeling that the subtests should be condensed. Some respondents noted the lack of time to complete the subtests; another teacher stated that while he or she gave all the subtests, “it took an enormous amount of time to give the test.” A respondent mentioned that despite the expensive cost of the curriculum, not enough placement tests (subtests) were included in the materials to cover all the students at the school for one year. Finally, it was stated by one teacher that the subtests were too “overwhelming” to even attempt to administer them to students. Table 8 depicts the frequency with which teachers gave each subtest, also noting how many teachers did not give any of the subtests at all.

Table 8

Use of Equals Subtests by Respondents for Determining Beginning of Instruction

Subtest	# Teachers Administering	% Teachers Administering
Attending & Exploring	20	23.3
Numbers & Operations	17	19.8
Geometry	15	17.4
Algebra	14	16.3
Measurement	14	16.3
Data Analysis & Probability	12	14.0
No Subtest Given	29	33.7

Note. Percentages add up to greater than 100%, as some teachers gave multiple subtests. No Subtest Given contains duplicates.

Teachers were also asked how many days per week, if any, they used the Equals curriculum. Furthermore, they were asked to note whether they used only the Equals curriculum or supplemented it with their own curriculum and/or materials. When commenting about supplementing the Equals curriculum, 39 teachers stated that they supplemented the curriculum with their own teacher-created materials or a different mathematics curriculum, one of which stated that he or she “always” has to supplement with other materials to teach the concepts. Only four teachers indicated that they used only the Equals curriculum; however, one teacher who utilizes the Equals curriculum daily stated that he or she “still often supplements with his or her own curriculum and/or

materials.” Table 9 presents the frequency with which respondents (N=57) use the Equals curriculum.

Table 9

Number of Days Per Week Respondents Use Equals Curriculum (N=57)

Frequency	#	%
5 days per week	17	29.8
4 days per week	10	17.5
3 days per week	4	7.0
2 days per week	4	7.0
1 day per week	3	5.3
Not at all	19	33.3

Effectiveness of Curriculum

Respondents were asked to provide their perceived effectiveness of the Equals curriculum. Of the 63 teachers who answered this question, 26 (41.3%) found the curriculum to be either very effective or effective. Another 24 teachers (38.1%) felt the curriculum was somewhat effective, while the remaining 13 teachers (20.6%) thought the curriculum was not effective. These perceptions of effectiveness were then compared to (a) use of subtests (N=55), (b) frequency with which the curriculum was used (N=39), and (c) whether or not the teachers supplemented the Equals curriculum with teacher-

created curriculum and/or materials (N=43). These cross-tabulations were only done for survey questions that answered both questions addressed in each table and are located in Tables 10, 11, and 12, respectively.

Table 10

Teachers' Perceptions of Effectiveness of Curriculum Compared to Number of Subtests Administered (N = 55)

# Subtests Administered	Very Effective	Effective	Somewhat Effective	Not Effective
6 (n = 8)	1 (12.5%)	3 (37.5%)	4 (50.0%)	—
5 (n = 0)	—	—	—	—
4 (n = 2)	—	—	2 (100.0%)	—
3 (n = 2)	1 (50.0%)	1 (50.0%)	—	—
2 (n = 5)	—	2 (40.0%)	—	3 (60.0%)
1 (n = 9)	—	4 (44.4%)	4 (44.4%)	1 (11.1%)
0 (n = 29)	2 (6.9%)	8 (27.6%)	11 (37.9%)	8 (27.6%)

Note. The above “number of subtests administered” represents the actual amount of subtests administered, not the name of the subtest.

Table 11

Teachers' Perceptions of Effectiveness of Curriculum Compared to Number of Days Per Week Equals Curriculum Used (N = 39)

# Days Used	Very Effective	Effective	Somewhat Effective	Not Effective
5 (n = 18)	2 (11.1%)	7 (38.9%)	7 (38.9%)	2 (11.1%)
4 (n = 10)	1 (10.0%)	4 (40.0%)	4 (40.0%)	1 (10.0%)
3 (n = 4)	—	4 (100.0%)	—	—
2 (n = 3)	—	1 (33.3%)	—	2 (66.7%)
1 (n = 4)	—	—	1 (25.0%)	3 (75.0%)

Table 12

Teachers' Perceptions of Effectiveness of Curriculum Compared to Balance of Equals and Other Curriculum (N = 43)

# Days Used	Very Effective	Effective	Somewhat Effective	Not Effective
Equals Only (<i>n</i> = 4)	—	2 (50.0%)	2 (50.0%)	—
Equals and Other (<i>n</i> = 39)	3 (7.7%)	11 (28.2%)	19 (48.7%)	6 (15.4%)

Common Terms, Concepts, and Themes of Teachers' Perceptions of and Attitudes about the Curriculum

One term that was repeated throughout the survey responses was “time-consuming”. Fifteen teachers stated in some form that it was time-consuming to plan for the lessons when following the curriculum as prescribed. These comments included: “extensive prep time which is scarce;” “preparing for the lessons can often be timely and it takes a long time to gather the materials and put them in order to execute the lesson as instructed;” “the planning and prep time for one lesson is something that as a teacher is almost unfeasible” (one to two hours, as noted by a different teacher); and “the time it took to plan and organize the lessons was absolutely unacceptable”. It was noted by one teacher that “Equals is great for leveling students, but requires EXTENSIVE time to prepare and monitor.”

Seven teachers commented on how time-consuming the actual lessons are to deliver. One teacher noted that “the time required to implement the curriculum successfully and appropriately is far beyond what should be required of any teacher.” A different teacher stated having to sometimes go through three or four books to teach the required standards; this process was perceived as “time-consuming and [making it] hard to juggle everything.”

The lessons being confusing to the teachers was a perception found in eight teacher responses and feeling overwhelmed was perceived by four teachers. One teacher noted that the order of the lesson plans is difficult to teach on a daily basis and that he or she “ends up jumping around.” This same teacher noted that the graphing used for the Access Points (Alternate Achievement Standards) was difficult to figure out.

Curriculum materials and manipulatives was another theme that was found throughout the survey responses. Four teachers felt that there were too many materials needed for the individual lessons. One teacher noted that “many items needed for Equals math is not included in the kit.” Similarly, another teacher noted that he or she “can make my own lessons in shorter times than it takes for me to hunt and gather all of the materials Equals requires.”

It was noted that the concept is good but it is “OVERWHELMING WITH ALL THE MANIPULATIVES” and that “teachers would have to spend countless hours of their own time preparing materials, more than what should be expected.” In addition to the theme of excess required materials, one teacher expressed a concern that the manipulatives include “small objects” that can be put into students’ mouths.

Another teacher commented as to the quality of the manipulatives for the price that was paid by his or her school district for the curriculum kits. This teacher stated, “The curriculum has been good as far as the manipulatives but were not anything special as the items can be purchased from just about any store.” However, five teachers stated in their responses that they liked the manipulatives of the Equals curriculum. One teacher noted that his or her students with low cognitive abilities benefited from the manipulatives, especially the counters, and another teacher stated that he or she “loves the manipulatives”.

The matching of curriculum to the particular student population was another common theme among many survey responses. Six teachers perceived the curriculum to be too high-leveled (difficult) for students with lower cognitive abilities, while four teachers perceived the curriculum to be too low-leveled (easy) for students with higher cognitive abilities. One teacher noted that “many of the lessons are too high for my students.” Another teacher stated that the Equals curriculum “did not service my modified students because they were on a higher level than the program.” This same teacher noted that the level of the curriculum was “below my parents’ and students’ expectations.” Similarly, a teacher stated, “most of the lessons were too simple and easy” for his or her students.

Another theme related to student population was the number of different grades and ability levels in which the students were working. Five teachers made specific comments about this topic. Some of those include: “we have students at many different grade levels and many different learning levels;” and “I have three grade levels in my

classroom so sometimes just to teach one lesson or topic, I need 3 books per grade level and materials.”

Several teachers mentioned the expense of the curriculum to the district and or commented on their own personal expenses as they relate to the Equals curriculum. One teacher stated having had to spend “over \$300 in color ink” to print worksheets. This teacher stated that lessons on the concept of learning colors require the worksheets to be printed in color to be effective for students. The teacher went on to state that the district’s representative for Equals told him or her to “have the paraprofessionals color by hand each worksheet per student” as a way to cut costs. Another teacher noted that he or she has spent “lots of money printing, laminating, cutting, and purchasing items to prepare for the testing”. Finally, a teacher stated, “I continuously scour [websites] for materials and spend approximately \$1,000 a year.”

Among the themes, two teachers had specific positive attitudes toward and comments about the Equals curriculum. One teacher stated, “I love the program. It is general so I can adjust the lesson to the needs of my students.” Another teacher stated, “I think that Equals math is great. It is very scripted and breaks it down for the teacher as well as the student. My students love it and get very excited and into the lessons.” This teacher thought the curriculum’s hands-on approach and the fact that there are several ways and ideas to teach a concept were wonderful facets.

The last major theme that was found in the survey responses involved the difficulty in aligning the curriculum to (a) Common Core Standards and Access Points, (b) the Individual Education Plan, and to (c) the Florida Alternate Assessment. One

teacher commented that it is his or her perception that this curriculum creates the need to add curriculum goals to the students' IEPs pertaining to math skills that are more curriculum-related than student-related, making them not as "individualized". Another teacher noted that "the Equals curriculum does not line up with Alternate Assessment." According to the survey question response, this teacher now uses his or her "own math units that line up with my district's math maps" and incorporates the Equals curriculum "whenever I can." Finally, a teacher stated, "Equals does not follow the standard to which each grade level has and what our students are tested on the Alternate Assessment."

Summary

This chapter began by discussing what type of data analysis was utilized for this study and the variables of the study. The study's variables, as well as descriptive statistics, were discussed. Quantitative data were calculated with the Mann-Whitney *U* Test through SPSS. The results of the quantitative research questions showed that there was no statistically significant difference of the Equals mathematics curriculum on the 2012 Florida Alternate Assessment mathematics scores. The qualitative research question data were also reported in this chapter. This data provided teachers' perceptions of and attitudes about the Equals curriculum. Chapter 5 will present a discussion of findings and present implications for future research on this topic.

CHAPTER 5 SUMMARY AND DISCUSSION OF FINDINGS

Introduction

In Chapter 4, both the quantitative and qualitative data were reported. The quantitative data were analyzed and indicated no evidence of a statistically significant difference in using the Equals curriculum as compared to using other types of mathematics instruction when pertaining to the 2012 Florida Alternate Assessment mathematics scores. This chapter will discuss the implications of the quantitative findings as well as the results and connections found within the qualitative data. The implications for mathematics instruction for students with disabilities will be discussed as well as the implications for district-level personnel when selecting mathematics curriculum for this population of students. Finally, recommendations for future studies will be noted for consideration by school districts that are either using or not using the curriculum.

Discussion of Findings

Few prior studies researched the effectiveness of the Equals mathematics curriculum. In fact, the only research specific to this curriculum was located on the website of Ablenet, the company that manufactures, sells, and distributes the Equals curriculum, in the form of a white paper. The study on the Ablenet website was favorable for the use of the curriculum; Satterfield and Ross-Brown (2013) reported that all the students showed progress and that the teachers felt the Equals curriculum was

effective. The teacher effectiveness conclusion is not in complete agreement with the qualitative survey results in the current study. Of 63 teachers in the current study who answered a question about the effectiveness of the Equals curriculum, 23 teachers (36.5%) felt the curriculum was “effective” and 24 teachers (38.1%) felt the curriculum was “somewhat effective.” However, the survey results showed that 13 teachers (20.6%) perceived the curriculum as being “not effective”.

Other perceptions of and attitudes about the Equals curriculum were enlightening. Several teachers stated that they disliked the curriculum so much that they were refusing to use the curriculum. One teacher stated, “I do not use the program. The Equals kit sits in a storage closet collecting dust.” This teacher clarified this action by stating that the lessons took too much time to plan and were confusing for the teachers and the students to follow. Other teachers noted that they no longer used the curriculum because it was not challenging enough for their students.

When examining the perceptions of the effectiveness of the curriculum, it was interesting to note that of 43 teachers reporting their perception of effectiveness, only 4 teachers reported using only the Equals curriculum for mathematics instruction; they felt the curriculum was either “effective” or “somewhat effective.” The remaining 39 teachers reported using teacher-created curriculum and/or materials in addition to the Equals curriculum; subsequently, the majority of these teachers (64.1%) reported feeling that the curriculum was either “somewhat effective” or “not effective”. These results lead to the question of whether this lack of fidelity of implementation affects its effectiveness. The most positive responses were reported by those who used the

curriculum every day of the week, while those who used the curriculum fewer days of the week reported weaker responses regarding effectiveness. Strength of implementation, not a topic found in the prior literature, warrants further exploration.

Implications for Practice

Since NCLB mandates that all students, including those with disabilities, must be proficient in mathematics by the year 2014, it is imperative that the state's Department of Education, specifically the office responsible for ESE, take a more active role in finding research-based curricula that has been studied by more than the manufacturing company. In theory, research should show that the curriculum makes statistically significant impacts on the mathematics performance of students with disabilities. One teacher's survey response noted that there does not appear to be an even playing field between students participating in the FCAT and the FAA in terms of curriculum; the teacher stated that it seems the students who participate in the FAA are not treated as importantly as those students who participate in the FCAT. At a school level, this perception could stem from a feeling that the FAA scores are not as important as the FCAT scores; however, as noted in Chapter 2, FAA scores are now calculated into school grades and AYP.

Individual school districts need to help teachers to help students make learning gains by providing them with curriculum that has been thoroughly researched in an unbiased fashion. School districts must also find curricula that do not overwhelm teachers; as evidenced by the survey responses. Bulky curriculum possibly affects its fidelity because it increases the tendency to not be used as prescribed. It would be

beneficial and cost-effective for school districts to pilot the curriculum at several schools and solicit anonymous feedback from the teachers that use the new curriculum. Districts need to take this feedback seriously and integrate it as a large part of their decision-making process when deciding which curriculum to purchase before buying the curriculum for the entire district.

Another benefit of having pilot programs for curriculum, especially when used with students with disabilities, is to monitor whether or not it can be properly funded by the school district. This recommendation is spurred by comments such as those presented by the teacher told by the district to have the paraprofessionals hand-color every worksheet needed for the lesson to save on printing costs. The statements of teachers regarding their feelings that the curriculum training was inadequate should be seriously examined, considering the cost of the curriculum to the districts in curriculum kits and staff development, as well as the amount of money being spent by teachers who are trying to implement the curriculum correctly. The current study uncovered that teachers can spend between \$300 and over \$1,000 to properly implement the curriculum.

School districts should ensure that all teachers utilizing the Equals curriculum are trained by someone from the manufacturing company versus district staff training or teachers training themselves. Paraprofessionals that will be assisting in mathematics instruction should also receive the same training as the teachers. Training is important because the type of training that is received by the teachers could be affecting their usage of the curriculum by making them feel more knowledgeable of the curriculum. If

teachers, as well as paraprofessionals, are adequately trained this could affect the effectiveness of the curriculum.

Even though the quantitative data showed that there is no statistically significant impact of using this curriculum, the interesting and surprising findings of the qualitative data have more of an impact for implications for school districts. Surveys can be done anonymously and very inexpensively, even at no cost at all, and can provide district curriculum departments with honest and critical information before unnecessary expenditures are made. It would be beneficial for school districts who are considering purchasing the Equals curriculum to make the aforementioned observations and teacher feedback a part of their decision-making process.

Recommendations for Future Studies

Further research needs to be conducted, not only on the Equals curriculum, but with any curriculum that is intended to help ESE students make learning gains in core content areas such as reading and mathematics. Future research of the Equals curriculum should include:

1. Research conducted with treatment group beginning to use the Equals curriculum at the same time. Note what curricula the control group is using.
2. Treatment group must only be using the Equals curriculum in order to truly determine the effectiveness of the curriculum. If other materials (teacher-created and/or a different mathematics curriculum) is used, it

could affect the quantitative and qualitative results of the study as it relates to the effectiveness of the Equals mathematics curriculum.

3. Determine the exact financial cost of the Equals curriculum for each individual school and/or school district in the treatment group as well as the cost of the mathematics curricula used in the individual schools and/or school districts in the control group.
4. Research should utilize raw scores of individual students in the treatment and control groups for quantitative research to determine any effectiveness (even the student does not reach proficiency level).
5. Teacher input needs to be a critical part of the research as teachers serve as the conduit between the curriculum and the students. Additionally, teachers are the individuals who know that these students are often unable to be understood due to the nature of their disability.
6. Observations of the curriculum being used, not only by the researcher but also by school and district administration.
 - a. Observations should begin with the lesson planning process so observers can see the efforts involved in planning a lesson for students who are on different grade levels and performing at different ability levels, even when all students are documented as being on the same grade level as one another.
 - b. Observations should also explore the possibility of having to plan a lesson for a student that requires the use of assistive technology.

These observations would provide administration with a more accurate picture of what teachers experience when using the Equals curriculum.

7. Conduct research in one school district piloting the program in at least one elementary, one middle, and one high school (treatment group) and compare to schools within that same school district.

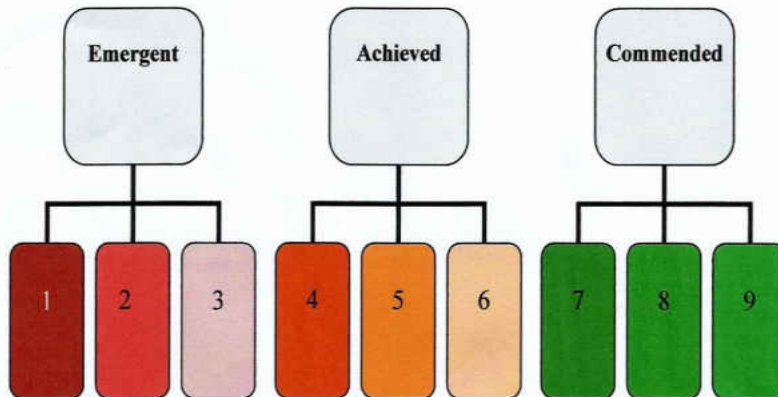
Conclusions

Teaching students with disabilities can be a very challenging job and the type of curriculum expected to be used to help these students can make that job easier or more difficult. It is imperative that school districts take the time to research the curriculum they are thinking about purchasing. The time spent in planning could result in more teacher satisfaction and motivation. More importantly, careful planning could lead to greater levels of student achievement.

APPENDIX A
PERFORMANCE LEVEL DESCRIPTORS OF FLORIDA ALTERNATE
ASSESSMENT (FAA)

**Florida Alternate Assessment (FAA)
School Grades
FY 2013**

Performance Level Descriptors
Proficiency: Achieved or Commended (4 & above)



Performance (High Standards) = Percent of students in FAA Levels 4 through 9

Learning Gains (School Overall Learning Gains)

Learning gains is demonstrated if a student:

- a) moves up a level (Level 1 to 2, 2 to 3, 3 to 4, etc.); or
- b) maintains a Level 4 or higher (Level 4 to 4, 5 to 5, 6 to 6, etc.); or
- c) maintains the same FAA non-proficient Level of 1, 2, or 3, and gain at least 5 points

Additional weighting (1.1) is given for students in Emergent FAA Levels 1,2, and 3 whose score increase from the prior year is at least 7 points.

(Center Schools Gains and Proficiency: School Improvement Rating, 2013)

APPENDIX B
ONLINE SURVEY: MATHEMATICS INSTRUCTION WITH THE EQUALS
CURRICULUM WITH STUDENTS WITH DISABILITIES

Mathematics instruction with the Equals Curriculum with Students with

***1. Do you teach mathematics to the students at your school site who are on the Florida Alternate Assessment? (Please answer yes even if only a portion of your students are on Alternate Assessment and regardless of the mathematics curriculum you are actually using.)**

- Yes *See comment section below for further response needed and then please continue with rest of survey
- No *If no, thank you for responding - you do not need to go any further in the survey.

If answered yes - are you the only mathematics teacher of students on Alternate Assessment at your school site or do you & other teacher(s) teach mathematics to these students? How many years have you been teaching students who are on Alternate Assessment? (Pls answer both)

2. What grade level of students who are on Alternate Assessment do you teach mathematics?

- Elementary (K-5) (*I realize that you may teach a K-2 unit)
- Middle (6-8)
- Elem/Middle (K-8) (*Please only check this if you teach students at any of these levels - i.e. use Elem if you only teach K-5)
- High (9-10) *did not include grades 11-12 as they are not a part of this study

Do you share the Equals Kit with other teachers or do you have your own kit?

3. What type of training did you receive? Was it a workshop with an Equals rep, district personnel, another teacher, etc? Did you receive the training prior to using the curriculum with students? Was the training adequate & did you receive on-going/post-training support? What type of training did the paraprofessionals receive? Please explain and be as thorough as possible.

4. Open response - please provide ANYTHING else you would like me to know as it pertains to the Equals curriculum & students who take the Alternate Assessment (i.e.-but not limited to - lesson planning, grading, cost effectiveness, time, student accessibility/expectations, use of assistive technology, etc.) Please be honest - remember that your responses are ANONYMOUS.

Mathematics instruction with the Equals Curriculum with Students with

5. Which of the six Equals sub-tests were administered to determine which level the students should begin instruction? (Please check all that apply.)

- Attending & Exploring
- Data Analysis and Probability
- Algebra
- Geometry
- Measurement
- Numbers and Operations
- None

If you administered the subtests, did you begin instruction based on the results of the students' subtests scores? Please answer yes or no. Please explain if you answered no re: instruction level. Also, if you checked "None" above, please explain.

6. During the 2011-2012 school year, how often did you use the Equals mathematics curriculum and did you use Equals only, a combination of Equals and teacher-created curriculum, teacher-created curriculum/materials only, and/or Equals wasn't available at my school site? (select one from 1st 6 choices and then all that applies from last 4 choices)

- 5 days a week
- 4 days a week
- 3 days a week
- 2 days a week
- 1 day a week
- Never
- Equals only
- Equals and teacher-created curriculum/materials
- Teacher-created curriculum/materials only
- Equals was not available at my school site

Comments:

7. How do you incorporate IEP goals and functional math skills into mathematics instruction using the Equals mathematics curriculum?

Mathematics instruction with the Equals Curriculum with Students with

8. How effective do you feel the Equals curriculum is with students who take the Florida Alternate Assessment in regards to learning gains/mathematics achievement?

Very effective

Effective

Somewhat effective

Not effective

Please explain your choice -

9. Educational background information (please check highest level only)

- Bachelors degree - Education
- Bachelors degree - Exceptional Student Education
- Bachelors degree - other
- Masters degree - Education
- Masters degree - Exceptional Student Education
- Masters degree - other
- Doctoral degree (Ed.D. or Ph.D.) - Education
- Doctoral degree (Ed.D. or Ph.D.) - Exceptional Student Education
- Doctoral degree (Ed.D. or Ph.D.) - other

If other - what field is your degree in (please designate which degree)?

10. Current/Valid Teacher certification and/or endorsements

- ESE K-12
- Hearing Impaired K-12
- Speech-Language Impaired K-12
- Visually Impaired K-12
- PreK-Primary Education (ages 3-grade 3)
- Elementary Education K-6
- Middle Grades Mathematics (grades 5-9)
- Middle School Integrated Curriculum
- Mathematics (grades 6-12)

Please list current endorsements you have or other certifications not listed above:

APPENDIX C
IRB APPROVAL OF EXEMPT HUMAN RESEARCH



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Jennifer C. Hughes

Date: September 17, 2012

Dear Researcher:

On 9/17/2012, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: A Study of the Relationship between the EQUALS Mathematics Curriculum and Florida Alternate Assessment Mathematics Scores of Students with Disabilities.
Investigator: Jennifer C. Hughes
IRB Number: SBE-12-08669
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 09/17/2012 04:03:49 PM EDT

IRB Coordinator

APPENDIX D
IRB ACKNOWLEDGEMENT OF STUDY CLOSURE



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Acknowledgment of Study Closure

From : **UCF Institutional Review Board #1**
FWA0000351, IRB00001138

To : **Jennifer C. Hughes**

Date : **June 14, 2013**

Dear Researcher:

On 6/14/2013 the IRB conducted an administrative review of the FORM: Study Closure Request that you submitted in iRIS. The study has been closed within the system.

This report is in regards to:

Type of Review: Study Closure
Project Title: A Study of the Relationship between the
EQUALS Mathematics Curriculum and Florida
Alternate Assessment Mathematics Scores of
Students with Disabilities.
Investigator: Jennifer C Hughes
IRB Number: SBE-12-08669
Funding Agency:
Grant Title:
Research ID: N/A

As part of this action:

- The research is permanently closed to enrollment.
- All participants have completed all research-related interventions.
- Collection of private identifiable information is completed.
- Analysis of private identifiable information is completed.

Thank you for notifying the IRB of this modification.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/14/2013 08:54:12 AM EDT

IRB Coordinator

Submission Reference Number: 017859

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