THE COST OF INEQUALITY: THE IMPORTANCE OF INVESTING IN HIGH QUALITY EARLY CHILDHOOD EDUCATION PROGRAMS

By

REBECCA S. KEITH

B.S., University of Colorado Boulder, 2003

M.S., University of Colorado Boulder, 2005

M.A., University of Colorado Colorado Springs, 2006

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This dissertation for the Doctor of Philosophy degree by

Rebecca S. Keith

has been approved for the

Department of Leadership, Research, and Foundations

by

Al Ramirez, Chair

Joseph Taylor

Sylvia Mendez

Margaret Scott

Corinne Harmon

Date_____

Keith, Rebecca S. (Ph.D., Leadership, Research, and Policy)

The Cost of Inequality: The Importance of Investing in High Quality Early Childhood Education Programs

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ABSTRACT

The focus of this dissertation was to explore the importance of high quality early education in later secondary education development, quantifying quality in early childhood education programs, and examining how teacher education contributes to quality of early childhood education programs. For phase I, early childhood education positively associated with improved eighth grade state proficiency percentages in the mathematics and writing summative assessment scores. When examining scoring procedures for *Colorado Shines* QRIS in phase II, programs that accepted Colorado Child Care Assistance Program (CCCAP), were not part of Colorado Preschool Program (CPP), had children that spoke more than one language, and accepted infants overall scored the lowest scores of early education programs. Phase III results showed that teachers with bachelor's degrees did not significantly improve overall student mathematics and literacy scores under *TS Gold* compared to students of teachers that did not have bachelor's degrees.

DEDICATION

This dissertation is dedicated to my parents, David and Mary Keith, who have fought for the equitable rights of early childhood education children for the past 25 years. Words will never be able to describe the admiration I carry for you both.

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INTRODUCTION

Globally, the United States has one of the highest levels of earnings inequality among employed individuals and the highest level of posttax – posttransfer income inequality among households – making it the most unequal affluent country in the Organization for Economic Cooperation and Development (OECD) countries (Brandolini & Smeeding, 2006; Kenworthy & Pontusson, 2005; Pontusson, 2005). When examining this inequality in relation to education, Checchi (2006) stated that initial positions of societal income inequality reduce access to education, and, as a consequence, future income distribution. Through this examination, Checchi proved that enrollment rates and income inequality (in the form of the Gini index) are negatively correlated, meaning families that are less financially stable have a harder time maintaining enrollment of children in school. Income inequality could be viewed, then, as intergenerational, continually preventing access to formal education of the poorest families. Throughout recent research, educational policymakers have placed an increasing interest in examining the effects access to formal education in a society play in reducing societal and income inequality (Kenworthy & Pontusson, 2005; Pontusson, 2005).

In the goal of reducing societal and income inequality, stakeholders within the early education industry urged the public that formal early childhood education should begin at infancy, especially in the current climate of parents and otherwise primary caregivers needing to work full-time (Karoly, Kilburn, & Cannon, 2006). Addressing the quality of early childhood education programs, an increasing number of federal and state lawmakers began to develop and implement policies in the early 2000s aimed at

increasing access to higher quality education among lower socio-economic groups, thereby increasing opportunities for better higher education and subsequent jobs (Epsing-Andersen et al., 2012). Stakeholders in early childhood education deemed action necessary to examine program quality, in terms of environment, teacher quality, curriculum, and management to afford all children the opportunity to attend high quality early childhood education schools. Multiple states, in an attempt to obtain grants from the Race to the Top–Early Learning Challenge (RTT-ELC), introduced and passed legislation to lead the way in defining early childhood education program quality (Wolfe, 2013). Authors of these bills, presented in Colorado Senate Bill 10-191 and House Bill 14-1317, stressed that a high quality, formal education in children's lives was required to produce productive citizens; with the expressed need for appropriate resources and instruction to build such early childhood education programs (Kroll, 2013).

Statement of Problem

Stakeholders and industry professionals stressed that access to early childhood education programs was simply not enough in providing equitable living matters. The quality of care, primarily examined through teachers' competency and curriculum development, greatly mattered. After the National Association for the Education of Young Children (2001) posited the guidelines for classifying metrics contributing to the definition of high quality early childhood education programs, focus transferred on how to determine the process to rate or grade the quality of individual early childhood education programs. In Colorado, industry professionals centered the foundation for defining high quality programs on rating early childhood education schools on a scale of one (low-quality) to five (high-quality), based on teacher effectiveness and education,

curriculum development, infrastructure and maintenance, and program diversity (Wolfe, 2013). On the national level, teacher quality became the point of discussion into whether teachers without a bachelor's degree could still offer the same level of classroom quality a teacher with a bachelor's degree was believed to produce.

As evident, there are still gaps in the research on high quality early childhood education program development. Therefore, this mixed-methods dissertation was designed to help address the current need for authentic research-based evidence for defining quality in early education programs and providing the need for equality in access to high quality early childhood education programs. It also examines how to best rate resulting high quality early education programs, and it examines what is, perhaps, one of the most contested contributors of defining high quality early childhood education – the impact of levels of teacher education. By interviewing those who are stakeholders in early childhood education, this dissertation will add to the body of knowledge of potential high quality program disparities and further offer suggestions for authentic improvements to promote social justice by efficiently incorporating this research into legitimate, meaningful, and impactful policy.

Overview of Dissertation

This dissertation used a multiphase, mixed methodology. The first phase of the dissertation determined whether offering high quality, early childhood institutional access to all students carried a positive association with success in subsequent grade levels after attending early childhood education programs. Specifically, this examination studied whether providing access to early childhood education was connected to state eighth

grade science, mathematics, writing, and literacy summative assessment scores. The proposed research question for Phase I was:

> IA. Will access to high quality early childhood education programs have a positive relationship with, at, or above proficiency on eighth grade student mathematics, science, writing, and literacy state summative assessment scores compared to scores of students who did not attend an early childhood education program?

To answer the research question of Phase I, an Ordinary Least Squares (OLS) regression was used to examine newly released state data (May, 2016) from the Annie E. Casey Foundation Annual Kids Count Data Center.

The second phase of the dissertation examined methods to determine whether an early childhood education program is of high quality. This phase examined whether rating early childhood education programs through *Colorado Shines* Quality Rating and Improvement System (QRIS) will help develop a foundation for an overall higher-quality early childhood education industry. A transformative design was used in which the Joint Committee on Standards for Educational Evaluation Program Evaluation Standards provided an overarching framework for the study (Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007). The framework determined whether the rating program improved or exacerbated high quality developmental trends of early childhood education programs. The data tested the theory that predicted whether the rating system would negatively, or unjustly, score the early childhood education programs that serve students from low-socioeconomic families compared to the programs that do not accept these students. The research question addressed in phase II was:

IIA. Will *Colorado Shines* QRIS reliably and validly rate the overall quality of early childhood education programs who enroll children from families of all socioeconomic levels?

To answer the research question, a specific type of Rosenbaum and Rubin's (1983) propensity score matching (PSM) at the program level was utlilized in which programs that accepted students receiving child care assistance funds were set as the experiemental variable compared to programs that did not accept students receiving child care assistance funds. A logistic regression first obtained a propensity score value of programs participating in *Colorado Shines* QRIS. Secondly, a nearest neighbor matching method examined and matched the overall distributions of the early childhood education programs' scores. Lastly, a fixed effects model determined if a difference existed in scores between programs that accept students of lower socioeconomic families versus those that do not.

The third phase of the dissertation called for the embedding of quantitative methods into qualitative methods, using multiple variables and sampling techniques in selecting lead early childhood education teachers at local preschool organizations. In the embedded mixed methods design, qualitative and quantitative data was collected across two phases (Patton, 2013). To answer the qualitative research questions, a case study approach was utilized, because the study involved research within a real-life, contemporary context (Yin, 2009). The Social Action Theory, developed by Weber, was the theoretical framework used to ground the research phase. The qualitative research questions identified for this case study were:

IIIA. Do preschool teachers believe that teachers who earned a bachelor's degree are more effective than those who do not have a bachelor's degree?

IIIB. Do directors of preschool programs believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree?

IIIC. Do parents of preschool children believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree?

To answer the quantitative research question, Hierarchical Linear Modeling (HLM) was utilized, because the participant, procedure, and results of the study were nested (Maas & Hox, 2005). The quantitative research question that was identified for phase III was:

IIID. Is having a preschool teacher with a bachelor's degree a significant predictor for success in mathematics and literacy school readiness as measured by the Colorado Department of Education endorsed *TS Gold* assessment?

Purpose of Dissertation

The purpose of this dissertation was to investigate the holistic parameters that define and describe high quality early childhood education, and the importance of offering equitable access to children of all socioeconomic brackets. This dissertation strove to provide meaningful and legitimate results that will hopefully aid in developing sound policy through three ways: (a) offering a national context on the importance of offering access to high quality early education to children of all socioeconomic statuses, and connecting the findings to reduction in adult social and income inequality; (b)

exposing the issues of adopting inappropriate rating systems in educational systems, and providing suggestions for a more structured and fair process for measuring the holistic quality of early childhood education programs than that currently being measured by programs, such as *Colorado Shines* QRIS, in Colorado; and (c) examining what level of teacher education is necessary to meet the unique needs of children who attend early childhood education programs, to increase the overall national quality of such programs.

Key Definitions and Terms

CCCAP – The Colorado Child Care Assistance Program.

CPP – The Colorado Preschool Program.

Colorado Shines QRIS – The Colorado state sponsored early childhood education quality rating systems.

Early Childhood Education – Education levels that include students of infancy to pre-kindergarten grade levels.

Level of Teacher Education – The formal education level early childhood education teachers have accomplished, primarily whether the teacher received certification through internship hours, an associate's degree, or a bachelor's degree.

NAEYC - National Association for the Education of Young Children.

RTT-ELC - Race to the Top–Early Learning Challenge.

School Readiness – The level of preschool student preparedness in social, behavioral, and instructional constructs when progressing in primary education grade levels.

TS Gold – The Colorado State endorsed, commercially developed early childhood education assessment program that measures growth in social, developmental, behavioral, educational, and language development domains.

Organization of the Dissertation

The organization for the remainder of the study is as follows. Chapter 2 provides a review of the literature related to the dissertation beginning with the discussion of why equitable access to early childhood education reduces adult income and social inequality, the importance of offering high quality early education programs, current methods on measuring quality of early education, and factors that contribute to high quality early childhood education. The remainder of the chapter examines the conceptual and theoretical frameworks for the dissertation. Chapter 3 provides the methodology for the three phases of the dissertation. A description of the variables, data sources, and the empirical and qualitative approach to the analysis are provided. Chapter 4 will present the empirical and qualitative results of each of the three phases. Lastly, Chapter 5 will include a discussion of the results, recommendations for practical application of the results into meaningful policy, and implications for future research. Hopefully, through this dissertation, examination into how international and national policy changes in early childhood education will be provided to create conditions for individual and organizational change in improving equality for all children.

CHAPTER II

REVIEW OF RELATED LITERATURE

As far back as the 1960's, Friedman (1962) argued a society that carried long-term differences in income status inequality continued to produce such rigidity that families stayed in the same financial position year after year. In an examination of the research that focused on why long-term differences in income status inequality persist, two common themes emerged. These themes emerged as (1) inequality of cognitive skills, and (2) inequality of human capital (Esping-Andersen, 1999). Through a meta-analysis of additional studies examining systems and development of human capital through educational means, researchers defined human capital as development of non-cognitive traits and abilities, such as motivation, tenacity, perseverance, leadership, discipline, enthusiasm, conscientiousness, aggressiveness, self-confidence, dependability, organization, commitment, trustworthiness, and likeability through an individual (Bowles, Gintis, & Osborne, 2001; Jencks, 1979; MacLeod, 1995). Within these studies, a common theme arose as the researchers stressed the right for educational access insuring that every individual had holistic opportunities to develop each non-cognitive trait to full capacity.

In a landmark study by Esping-Andersen (1999), the researcher determined there was an inequality of human and cultural capital between OECD countries, with the United States falling short among the countries. Esping-Andersen attributed that an inequality in income earnings related to human and cultural capital could not be found in access to just any educational level, but specifically to early education. Nordic countries that increasingly and consistently invested in public preschools and child care were found

to better reduce dispersions in income inequality later in life, therefore increasing mobility. In a later study by Esping-Andersen et al. (2012), the researchers determined countries that focused on increasing mobility of children were found in, “centers that do not replicate social class differences" (p. 527). Stated best by Schmit, Matthews, Smith, and Robbins (2013), children that experienced the highest level of poverty, and a later threat to income inequality, benefited the most from high quality early care and education programs. High quality early childhood education teachers assisting primary caregivers with educational, social, and emotional instruction supported the specific reason the researchers stressed the need for high quality care with children facing poverty. Therefore, in order for the United States to equalize with other OECD countries in terms of intellectual and human capital, the researchers deemed a solid investment in high quality, accessible early education vital.

Researchers describing the importance of investing in early childhood education have done so since the 1930s (Barnett & Nores, 2012). Multiple randomized trials, both cross-sectional and longitudinal, discovered that students attending formal early childhood education programs have stronger subject matter knowledge skills, pro-social behaviors, executive functions, lower instances of delinquency and crime, and tend to have better health (Bowles, Gintis, & Osborne, 2001; Jencks, 1979; MacLeod, 1995). Whereas various educators, through multiple studies, supported the cognitive need for early childhood education, the economic benefits are greatly contested. Consistent in political debates, the opinions varied among what families should be eligible in receiving financial assistance, appropriate program practices, what type teachers should lead in the

classrooms, and what financial return in investment would be present if greater resources were made available to these programs (Engle et al., 2011).

In support of developing human and cultural capital, educational researchers argued high quality early childhood education programs were needed to be able to address multiple intelligences for the benefit of all children. In these high quality early education programs, teachers challenged all learning types of students to inspire students to understand intellectual ability is more than the sums of one's genetic gifts. Eriksen, Kesmodel, Underbjerg, Kilburn, and Bertrand (2013) examined the effect of preschool/day care teachers' leadership on a child's intellectual quotient (IQ) when working to increase human and cultural capital. An example of working to increase human and cultural capital as early as possible, Eriksen et al. (2013) determined teacher interaction played an extremely important role in the development of the student. The researchers found that students scored higher on kindergarten entrance exams when participating in a developed high quality early education program in which teachers demonstrated strong leadership styles; program administrators developed rigorous, but appropriate, curriculum and directed play compared to the programs which consisted mostly of non-directional play. This study further supported the need to develop strong school readiness programs for every type of early childhood education program, private or public, regardless of socioeconomic status.

In addition to early childhood education access advantages to increasing subject matter knowledge and school readiness, perhaps one of the greatest contributions quality early childhood education offers in human capital is development of pro-social behaviors including a strong correlation in reduction of risks of participating in criminal behavior.

Multiple think tanks and initiatives reported that preschool is important in establishing law-abiding citizens. For example, Early Edge California posited that the state of California currently spends over ten times more on prisons than on preschool (Hill, 2008). This roughly works out to spending $4,000 annually per child in preschool compared to $60,000 annually per inmate. A recent report by Fight Crime Invest in Kids supported that by investing in high-quality preschool programs, California would be able to decrease its prison population by more than 13,000 each year and save roughly $1.1 billion (Hill, 2008). Recognizing that investment in children at the preschool level would replace many of California's financial issues, Senate Pro-Tem Steinberg introduced Senate Bill 837 in hopes of building the educational foundations of children across the state. No longer considered just "playschool," multiple professionals recognized the importance preschool plays in the evolution and development of the American child. As of July 2016, there were 14 bills that had been submitted to Congress supporting the need to build stronger preschool programs and the need for teacher development (Colorado Office of Early Childhood, 2015). Whereas many of the state and federal bills address the need for universal preschool built on the foundation of strong pedagogical and social domains, stakeholders have not come to a conclusive course of action in the development of teachers to lead these programs. Collaborators for Colorado Senate Bill 10-191 attempted to bridge the discussion of providing parameters to define effectiveness; however, the bill affords districts, schools, and preschool programs the ability to define what effectiveness means (DeRenzo, 2015).

Access to early childhood education additionally provided higher income and ability for job promotion in later adulthood. Although present, research that estimated the

economic returns to early childhood education was found to be lacking (Barnett & Nores, 2012). Engle et al. (2011) estimated that increasing early childhood enrollments from 25 to 50% would benefit a child's projected subsequent adult earnings. Not only found to increase adult earnings, early childhood education was also found to aid in other aspects of human capital (Karoly, Kilburn, & Cannon, 2006). Students who attended quality early childhood education programs had fewer failure and grade repetition, reduced need for special education services, reduced cost of support, reduced crime and criminal justice system costs, and reduced health care costs. Therefore, it is not merely enough to a country to offer child care, the care needs to be of high quality.

Classifying High-Quality Early Education Programs

Mckenzie (2013) stressed that high quality early childhood education programs primarily benefit children. Additional researchers supported Mckenzie's claim that quality aids the entire early childhood education profession, state, and nation (Bowman, Donovan, & Burns, 2001; Espinosa, 2002, Frede, 1998). In accordance with Colorado initiatives to improve overall quality of early childhood education programs, multiple researchers indicated that the most critical retention years of a child's life are within the first few years of life (Carlisle, Stanley, & Kemple, 2005; Marcon, 1999; Rous, Hallam, Grove, Robinson, & Machara, 2003). High quality initiatives reported by these researchers aim to aid these programs involved in the Race to the Top - Early Learning Challenge by increasing access to grants and funding. Additional supporters of these early childhood education programs testified to the need for improvement in assisting the child's early developmental years (Colorado Office of Early Childhood, 2015). States involved in improving the quality of early childhood education programs reported aiding

the development of the holistic child to ensure a positive and prosperous future for the United States of America (National Association of the Education of Young Children, 2009).

Child Development

Researchers found the importance of high quality early childhood education programs to be one of the most important components in child development (Raspa, McWilliam, & Ridley, 2001). Leading developmental neurologists Halfon, Uyeda, Inkelas, and Rice (2004) reported that the greatest production of neural connections aiding in academic development were from one to three years of life, therefore, optimal quality of early childhood educational programs was necessary to take advantage of developing these connections. Sociological researchers supported neurological research by placing into context how optimal brain functioning aided in the development of social and emotional skills that all children need to succeed in school and life (Castro, Garcia, & Markos, 2013; Weaver, 2002). In multiple rating systems, child development vastly improved through physical and psycho-educational practices, with health-related practices improvement benefiting the child, stability, and monitoring of emotional and physical disorders (Fiene, 2002). As states, such as Florida, Georgia, and Colorado, adopted improvement systems for early childhood education programs, the states additionally incorporated assessment systems to empirically examine age-appropriate outcomes as a means to determine if a child was reaching developmental norms (Krugly, Stein, & Centeno, 2014; Spodek, & Saracho, 2014). By early childhood education programs in these states engaging in high quality improvement initiatives, the programs received grants for adopting assessment programs to best aid in child development.

Additionally, research indicated that developmentally appropriate assessment proved as a hallmark of high quality childhood education programs and was associated with improved child outcomes (National Association of the Education of Young Children, 2009; Shepard, Kagan, & Wertz, 1998; Shonkoff & Meisels, 2000).

In connection to child development being the most important reason to adopt high quality initiatives, multiple researchers defined age-appropriate practices as a vital component when defining high quality early childhood education programs (Hart, Yang, Charlesworth, & Burts, 2003; Jackson, 2009; Marcon, 2002). An example of the importance of developmentally appropriate assessment practice in Colorado was the adoption of using the *Teaching Strategies GOLD (TS Gold)* assessment system to score children on age-appropriate tasks. Leaders involved in *Colorado Shines* QRIS granted funds to participating programs to purchase scoring tools and to attend rating training to assess children enrolled in early childhood education (Colorado Office of Early Childhood, 2015). Through these assessment tools, early education teachers could determine if any of their students tested behind in age-appropriate skill sets aiding in child development. These high quality assessment programs provided critical formative information leading to stronger child development efforts by helping teachers determine and recognize age appropriate knowledge and behavior and develop appropriate, differentiated instruction plans.

High quality early childhood education initiatives also aided teachers with recognition of a child's appropriate development of physical and psycho-educational skills, as well as many practices related to a child's health (Friedman, Brooks-Gunn, Vandell, & Weinraub, 1994; Hegland et al., 2011; Vandell, 2004). Through providing

funds for teachers to take coursework on recognition of common early childhood learning, social, and physiological disorders, the children ultimately benefited in development. Researchers stressed that early interventions were the most effective if teachers caught children's delays early through screenings offered from improvement initiatives, and thus provided families with access and instruction to appropriate community intervention services (Castro, Garcia, & Markos, 2013; Dixon et al., 2012).

Dixon et al. (2012) additionally found high quality rating systems to streamline programs that ultimately aided in childhood stability. Cohn and Chetley (1994) argued that the changing world has led to demands that affect social, learning, and physiological development within children. These demands have increased urbanization and changing patterns of employment in domestic settings, and produced mass migration within and between states. Research from the Rand Corporation supported Cohn and Chetley's (1994) conclusions of the tragedy of early childhood instability (Karoly, Kilburn, & Cannon, 2006). Movement between early childhood education programs ultimately supported the Rand Corporation's conclusions that alignment of programs could help reduce childhood stress associated with instability. *Colorado Shines* QRIS leaders stated that as a child moved from one early childhood education program to another, the high quality initiatives provided a smoother transition process – one of less stress to the child and family (Colorado Office of Early Childhood, 2015). Connections between programs involved in rating systems helped ensure children and families received the services needed to reduce transition upheaval (Fine & Mayer, 2006; Johnson & Rosenthal, 2009).

Teacher Development

By affording all students high quality early care and education, stakeholders in early childhood education believed action to examine the importance of teacher quality in context of program quality was also necessary. In addition to introducing and passing legislation to rate the quality of early childhood education programs, policymakers led the way in defining teacher quality and effectiveness (Wolfe, 2013). A sample of these bills included California's Senate Bill 837 in which lawmakers supported transitional preschool programs to prepare students for kindergarten (Hill & Varone, 2014). In this bill, prerequisites for preschool teachers wishing to obtain teaching certificates included extended studies to enhance program quality. Other state lawmakers, as noted in Colorado Senate Bill 10-191, posited effective teachers are needed to teach children in preschool (Wolfe, 2013).

Colorado stakeholders believed that high quality teachers were more qualified and able to provide a higher quality educational experience compared to teachers who were not qualified to meet the unique needs of very young children (Colorado Office of Early Childhood, 2015). Substantial evidence, through quality rating programs, has shown that higher levels of teacher education and training improved child development outcomes discussed earlier (Barnett, 2003; Burchinal, Cryer, & Clifford, 2002). An increase in the growing body of research also suggested that better trained teachers, "aid in more meaningful engagement of families in their children's early learning supports that children's preschool readiness and later academic success" (Colorado Office of Early Childhood, 2015, p.7). Policy leaders found teacher communication to be the basis for strong relationships and advanced family engagement in early education programs. Furthermore, the leaders advocated that high quality rating systems provided teacher

engagement programs to assist in stronger student and family connections (Carlisle, Stanley, & Kemple, 2005; Halgunseth, Peterson, Stark, & Moodie, 2009; Marcon, 1999).

Management and Leadership

Stakeholders spearheading the initiative to increase high quality early childhood education programs stressed that sound business and administration policies and procedures were critical in maintaining high quality levels of programs (Dodge, 1995; Frede, 1998). For example, researchers reported a respectful work environment contributed to recruitment and retention of qualified early childhood education staff. In a survey of early childhood education administrators, participants reported recruitment to be the greatest challenge for many programs, closely followed by staff retention (Ryan & Whitebook, 2012). Survey administrators conveyed a reason for this concern presented in financial compensation correlated to the quality and retention of staffing (Bella & Bloom, 2003; Phillipsen, Burchinal, Howes, & Cryer, 1997). Many potential early childhood education teachers accepted jobs in primary education due to higher salaries and benefits, all lacking in most early childhood education programs. Further researchers stated that leaders of any educational programs which focused on professional development allowed staff networking and mentoring opportunities, and this potentially aided in program quality (DeBord & Sawyer, 1996; Weaver, 2002).

Defining Quality in Early Childhood Education Programs

In the early 2000s, leaders of the National Association for the Education of Young Children (NAEYC) positioned a statement on how the organization classified a high-quality early childhood education program (Harmon, 2001). Leaders of the association believed high-quality programs were developed by adopting three major practices

(Sadowski, 2006). These practices included developing age-appropriate practices; consistently researching how all children learn (learning styles of children change from generation to generation and between socioeconomic statuses); and evolving standards to define an accomplished, high-quality early education teacher.

Age-Appropriate Practices

Multiple researchers have defined age-appropriate practices as the most important component when defining high-quality programs (Bogard, Traylor, & Takanishi, 2008; Jackson, 2009; Marcon, 2002). Initial research stated that in early childhood classrooms, children appeared to be more creative and used more divergent thinking in child-initiated learning classrooms compared to students in didactic, academic-center classrooms (Mckenzie, 2013). Mckenzie argued that classrooms that more consciously focused on age-appropriate practices created higher-achieving students who displayed fewer stress behaviors, such as fidgeting or aggressive behavior. Additional researchers supported Mckenzie's belief that students who attended programs that primarily focused on age-appropriate skills had stronger verbal, relationship, social, and daily living skills, and on average, had prepared better for kindergarten compared to students taught in developmentally inappropriate settings (Marcon, 2002).

Early Childhood Education Programs Among Socioeconomic Groups

Previously, high-quality child development programs were only available to families wealthy enough to pay the substantial tuition fees (Burchinal, Hyson, & Zaslow, 2008). Walker (2001) concluded that the U.S. Department of Education's 2000 report on school readiness described an alarming gap in school readiness among children from varying socioeconomic brackets. In this report, researchers observed, while many states

were actively supplying school readiness programs, such as Head Start and state-sponsored early education programs serving low income families, debate still existed about whether students were receiving high-quality education. Additionally, economists reported high quality early childhood education programs were only available to families wealthy enough to pay the substantial tuition fees (Walker, 2001). The report specifically outlined a breakdown in reaching lower income families, who often were unaware these programs even existed. Furthermore, Walker stated a complete lack of programs was being developed to target children from middle-income families, who often lacked the financial resources to attend quality preschools. Too often these children were caught in the seam between not being wealthy enough to pay for high quality, private school readiness programs and having family incomes too high to take part in subsidized programs, like Head Start (Gormley, Gayer, Phillips, & Dawson, 2005). Walker (2001) stated the true crisis reflected in the broad lack of readiness of children from lower socioeconomic groups, compared to those from higher groups. All students deserved the right to attend school readiness programs taught by competent teachers. Therefore, a country-wide initiative to develop high-quality early childhood education was adopted to decrease the learning gap between students of all socioeconomic groups (Gormley, Gayer, Phillips, & Dawson, 2005).

Early Education Teachers

Burchinal et al. (2008) stated no researcher, policymaker, or director doubted that the quality of the classroom teacher mattered. The argument of evolving appropriate standards to define an accomplished, high quality early education teacher which solely rests on teacher education degrees, and whether they are producing desired outcomes,

proved to be at the center of the standards debate. Burchinal et al. argued monumental policy was being developed on teacher education standards originating from informal observations instead of experimental studies. This reflection supported Weber's Social Action Theory of how informal observation illogically empowered policymakers to make financial and developmental changes regarding early education programs (Secher, 1962). As a response from the *Improving Head Start for School Readiness Act of 2007,* 17 of 38 states, which provided public early education, began to require half of all lead early education teachers to earn a bachelor's degree to teach, as these states developed early education standards (Early et al., 2006). Kroll (2013) therefore asked, "What standards define a high-quality teacher, and are all current early education teachers capable of teaching to these standards" (p. 64)?

Stakeholders in the debate of defining high quality early education programs have mostly been unified in terms of age-appropriate practices and the need to provide high-quality education to students of all socioeconomic classes. The lack of congruity and agreement existed in determining which type of early education teacher was best suited to instruct these programs (Kroll, 2013). Early education teacher quality has been a pressing issue in the public forum for years, and Mckenzie (2013) stated the issue was perhaps the most important factor in determining student success. Researchers such as Clotfeller, Ladd, and Vigdor (2007) reported a positive relationship between subject matter knowledge and teacher performance, but later researchers such as Colker (2008) stated there was more than one pathway for a teacher to gain subject matter knowledge. These pathways for early education teachers to demonstrate appropriate subject matter knowledge and practices could be found through receiving a bachelor's degree from a

certified university or college, earning an associates' degree with appropriate coursework from an accredited two-year community college, or through certification by selected coursework and internship experience (Ahl, 2006).

Hyson, Tomlinson, and Morris (2008) stressed that no teacher education program, however high in professor and class quality, could be entirely responsible for providing optimal teacher quality and child development. The National Association for the Education of Young Children, or NAEYC, organizational leaders stressed the debate on teacher education must shift away from discussion of what programs are best suited to build high quality teachers to what methods or standards are required to build high quality programs (Buysse & Wesley, 2006). Buysee and Wesley (2006) analyzed that the NAEYC standards, along with the National Council for the Accreditation of Teacher Education, supported the development of high quality teachers through bachelor's degrees, associates' degree programs, or evidence-based practice through internship. The NAEYC adopted the belief of multiple pathways to high quality teachers by stating that not all early childhood education degree programs are high quality. Additionally, if a teacher does earn a bachelor's degree, evidence-based practice in forms of internships cannot be ignored or waived (Sadowski, 2006). A teacher still needed an apprenticeship period with an experienced teacher before becoming a solo instructor.

For example, Early et al. (2006) measured teacher education in three different forms: degree, major, and certification. The researchers failed to find any significant difference in classroom quality among the three different pathways of becoming an early education teacher. Limitations of the study were found in the relatively small geographical area the researchers used. This limitation was addressed in a follow-up

study that examined high-quality early education programs across state lines (Early et al., 2007). In the subsequent project, the researchers found that early education classrooms were difficult to study due to the different states' providing varied definitions of high-quality programs. This ultimately created varied certification parameters. The researchers stated although there were programs that varied in levels of teaching experience and education, children that were at the highest risk of underachievement came from classrooms taught by teachers, from either degree programs or certification means, who were poorly prepared. Conclusions from this article concluded that focus should swing from initial certification/education to continuing education in attempts to further develop practice in the classroom.

Colorado Constructs to Measure Early Childhood Education Quality

Colorado Shines QRIS

Through *Colorado Shines* Quality Rating and Improvement System (QRIS) industry professionals centered the foundation for defining high quality programs in Colorado on rating early childhood education schools on a scale of one (low-quality) to five (high-quality), that was based on teacher effectiveness and education, curriculum development, infrastructure and maintenance, and program diversity (Colorado Office of Early Childhood, 2015). The Colorado Department of Human Services (DHS) and the Colorado Department of Education (CDE) posited this policy to rate every Colorado early childhood education program to receive quality rating scores through *Colorado Shines* QRIS. *Colorado Shines* leaders stated that QRIS advocates for young children, as the leaders designed outcomes of the program to address improvement in child development, curriculum, teacher effectiveness, management, and facility condition

(Colorado Office of Early Childhood, 2015). Initiatives, such as *Colorado Shines* QRIS, claimed to assist programs in management responsibilities, relieving management to assess, enhance, and increase communication quality in individual programs. State leaders believed this would create higher quality early childhood education programs and preschools throughout the state to better serve the needs of all young children (Colorado Office of Early Childhood, 2015).

Teaching Strategies GOLD

Leaders at the CDE recognized the need to reach out to all learning types when they revamped the early childhood education standards in order to become more competitive for receiving a Race to the Top – Early Learning Challenge (RRT-ELC) grant (Wolfe, 2013). Unsurprisingly, in the 2014 Colorado Preschool Program Legislative Report, CDE leaders spent the majority of the preschool description section detailing the need for trained teachers since one of the highest weighted categories for receiving awarded points in RRT-ELC dealt with teacher effectiveness. The report stressed Colker's (2008) conclusions that in order for teachers to optimize learning for each preschool child in her care, the lead teacher needed to encompass a thorough knowledge of child development in socio-emotional, physical, and cognitive areas as well as literacy, mathematics, and science content. Once the state leaders addressed multiple intelligences in the standards and stressed the need to place teachers in the classroom who understood these needs, early childhood education leaders sought to find a number of assessments a preschool program could use to measure the entire scope of skills a student would hopefully exhibit before moving on to kindergarten (Reed, 2014). Out of 26 private- and state-built exams reviewed to date, as of the time this research was

undertaken, the CDE had only accepted one in its unrevised state: *Teaching Strategies GOLD* (*TS Gold*). The CDE rated *TS Gold* as the premier program to use due to its strengths, such as the inclusion of all phase of preschool education -- infants to pre-kindergarten age, validity and authenticity, instruction involving all multiple intelligences, and strong leadership representation.

Conceptual Framework

The following conceptual framework was adopted to assist in answering the Phase II research question: Will *Colorado Shines* QRIS reliably and validly rate the overall quality of early childhood education programs who enroll children from families of all socioeconomic levels? During an American Evaluation Association annual conference, then president Rog (2009) stated, "Attention to context helps to produce findings that are generalizable and useful to a wider set of stakeholders outside the local decision-making context". Placed into context of Rog's charge to address the need of producing evaluation methods that even individuals outside of the program can follow, primarily the second phase of the dissertation examined how the mindset of an entire community drives decision making to improve the overall quality of early childhood education. The Joint Committee on Standards for Educational Evaluation (JCSEE) Program Evaluation Standards are used as the framework for this phase of the dissertation to examine if leaders of *Colorado Shines* QRIS effectively created a program that truly improved the overall quality of early childhood education programs located in Colorado. Yarbrough, Shulha, Hopson, and Caruthers (2011) specified that when industry professionals evaluate a program for efficiency and productivity, examiners are responsible for measuring utility, feasibility, propriety, accuracy, and accountability of

the proposed program. Figure 2.1 represents McMahon and Cullinan's (2014) conceptual framework demonstrating Yarbrough et al. (2011) JCSEE Program Evaluation Standards.

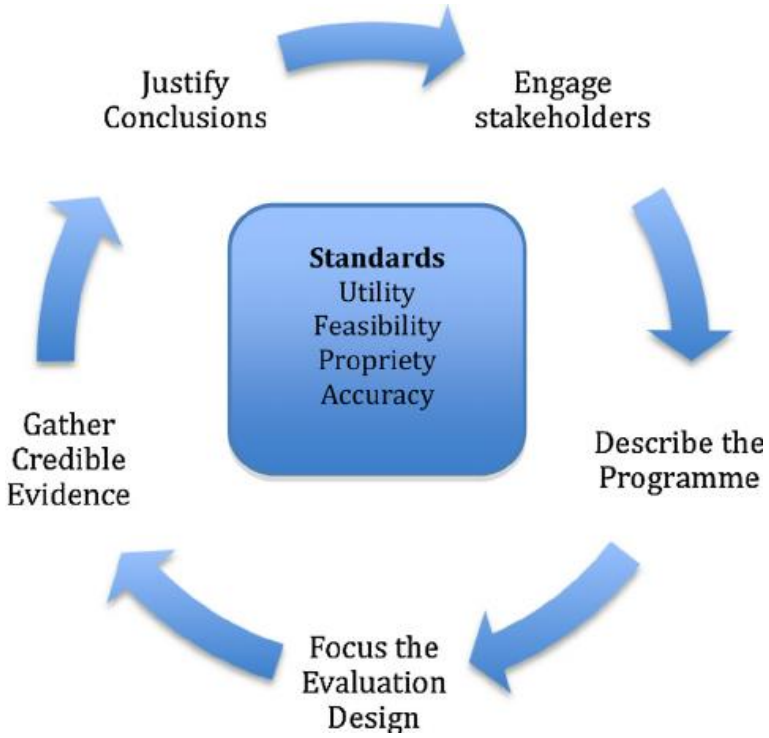

Figure 2.1. Proposed conceptual framework adapted from "Brief report: Forecasting the economic burden of autism in 2015 and 2025 in the United States", by J. P. Leigh and J. Du, J, 2015, *Journal of Autism and Developmental Disorders*, *45*(12), 4135-4139. Copyright 2015 by the Center of Disease Control.

Yarbrough et al. (2011) reasoned that, "the utility standards are intended to increase the extent to which program stakeholders find evaluation processes and products valuable in meeting their needs" (p. 65). These standards were developed so that supporting stakeholders of the policy guard against non-deliberate, negative consequences to the benefactors of the program. The utility standard was aligned with the research question determining if *Colorado Shines* QRIS is raising the quality of early childhood education programs present through increasing scores, or in actuality, causing

centers who serve low socioeconomic families to close due to impractical, non-cost effective standards of the program. The second JCSEE standard, feasibility standard, examined the policy's, "effectiveness and efficiency" (p. 93). Through this standard, it was observed whether *Colorado Shines* QRIS uses scorers, rating systems, cultural interests, and political interests effectively and efficiently when scoring early childhood education programs in Colorado. As the third JCSEE standard, propriety standards, "support what is proper, fair, legal, right and just in evaluations" (p. 125). The major concept associated with this standard was whether program participants felt that *Colorado Shines* QRIS raters were responsive to the needs of the participants, and that all evaluations used in the rating of the programs were fair and understandable in addressing the needs of early childhood education programs. Lastly, the final standard used in the second phase of the dissertation was the accuracy standard. The accuracy standard was intended to, "increase the dependability and truthfulness of evaluation representations, propositions, and findings, especially those that support interpretations and judgments about quality" (p. 165). Placed into the context of this dissertation, this standard was used as a means to question stakeholders if they felt the evaluation accurately scored their program.

Theoretical Framework

The theoretical framework was selected to provide reasoning into the conclusions of the third phase of the dissertation. The increased dialogue at the federal levels in the middle 2000s provided evidence that bureaucratic agencies were taking greater responsibility in decision making for preschool programs traditionally controlled at the local level. Placed into context, the third phase of this dissertation examined how the mindset of directors and parents preferring teachers with bachelor's degrees, because they

presume them to be better prepared teachers, influences state and federal educational leaders when deciding to create policy requiring all preschool teachers to earn bachelor's degrees. Thus, Weber's Social Action Theory was used to explain how social perceptions at the micro level of society influence individuals carrying out rational social actions designed to achieve goals of bureaucracies at the macro level of society (Bryant, 2014). Figure 2.2 represents Secher's (1962) conceptual framework demonstrating Weber's Social Action Theory.

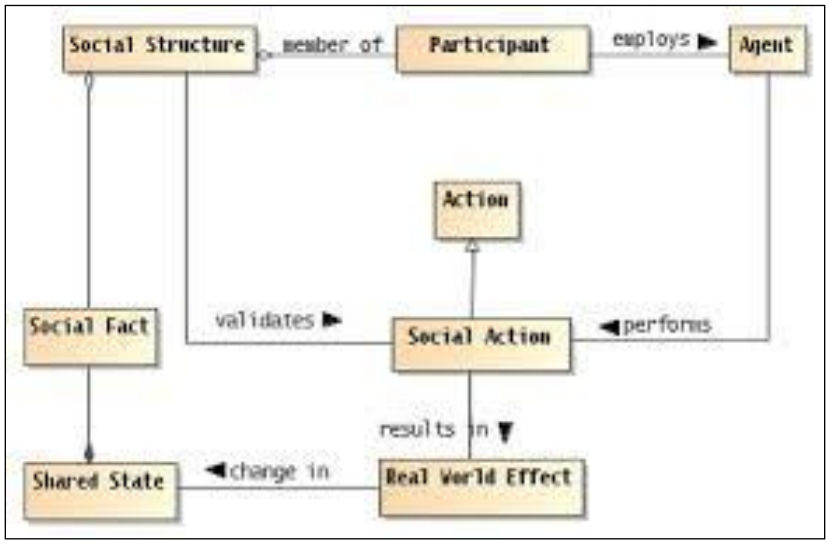

Figure 2.2. Conceptual framework from Weber's Social Action Theory. Adapted from *Basic concepts in sociology. Contributors: Max Weber*, by H. P. Secher, 1962, New York, NY, Citadel Press. Copyright 1962 by Philosophical Libraries, Inc.

According to Priya (2014), Weber's Social Action Theory includes four types of social action—instrumental-rational action, value-rational action, traditional action, and effective action. The first type of action is instrumental-rational action. This action is "geared toward the efficient pursuit of goals through calculating the advantages and disadvantages associated with the possible means for realizing them" (Secher, 1962, p.

114). Under this type of action, policymakers examine the financial and educational benefits and limitations of requiring all preschool teachers to earn bachelor's degrees. Like instrumental-rational action, value-rational action involves "the strategic selection of means capable of effectively achieving one's goals" (p. 116). Examples of this type of action include risking upset of one's political cohort if a decision is made regarding preschool teacher education and it is an unpopular decision, and vice versa. The third type of social action outlined by Weber is traditional action, where, "behaviors are determined by habit or longstanding custom" (p. 117). In this type of social action, policymakers may make the decision whether or not teacher degrees maximize efficiency of the educational system based on tradition established by routine of preschool programs. The fourth type is affective action, which is described by impulsiveness or a display of unchecked emotions. Policymakers make decisions that are educationally and financially unfeasible based on international testing scores or selected group pressures instead of rationally deciding a course of action. Figure 2.3 represents the proposed conceptual framework demonstrating the context and connectivity of preschool hierarchy and the debate of teacher education.

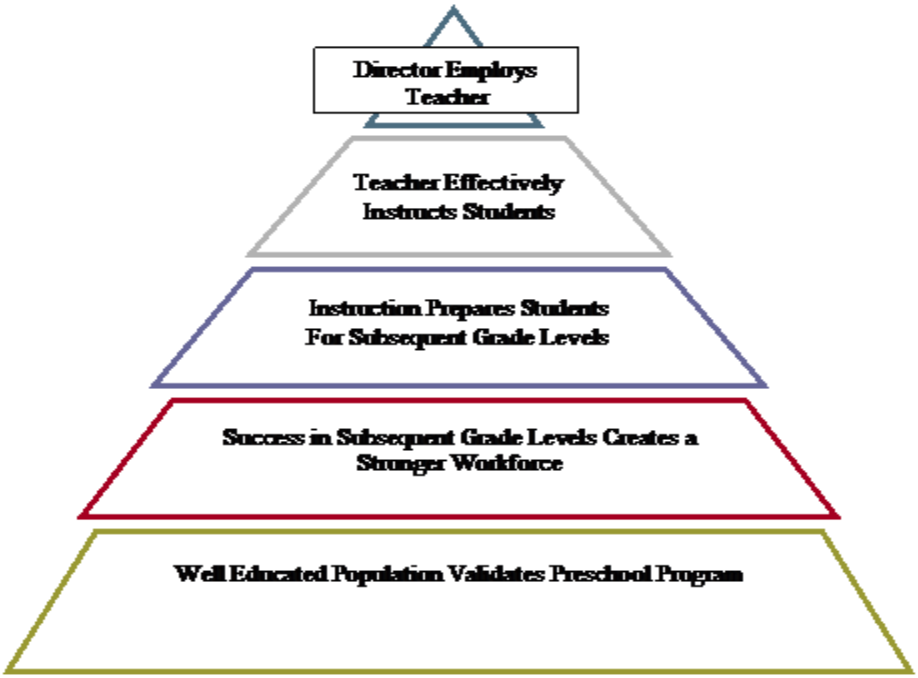

Figure 2.3. Proposed conceptual framework adapted from *Basic concepts in sociology. Contributors: Max Weber*, by H. P. Secher, 1962, New York, NY, Citadel Press. Copyright 1962 by Philosophical Libraries, Inc.

The four significant types of Weber's theory provide insight into the discussion of whether preschool teachers should be required to earn bachelor's degrees under a more formal level of education to better prepare students for subsequent grade levels. Therefore, the third phase of the dissertation strives to describe how agents at the state and federal levels follow decision methods, both rational and irrational, utilizing aspects of Weber's bureaucratic organization when they build legislation for preschool teacher education. This theory will especially be useful in describing policymakers' need to expand analysis of Weber's fourth type of action to ensure that appropriate evidence of the decision is obtained before policy is deployed.

Summary

As evident, there are still gaps in the research on high quality early childhood education program development. Therefore, this dissertation was designed to help address the shortcomings of research-based evidence for requiring the conditions on how to best rate high quality early education programs. By interviewing those who are stakeholders in early childhood education, this dissertation will hopefully add to the body of knowledge of potential high quality program disparities and further offer suggestions for authentic improvement to efficiently incorporate into legitimate, meaningful policy.

CHAPTER III

METHODOLOGY

This mixed methods dissertation addressed the importance of the United States investing in high quality early childhood education. The specific phases are: I. To examine the relationship access to early childhood education provides in school readiness for primary and secondary education grades; II. To identify the validity and reliability metrics of *Colorado Shines* QRIS that quantifies and scores high quality characteristics of early childhood education programs in the state of Colorado; III. To discover the impact of early childhood teacher education when creating a high quality early education experience. The study collected quantitative data in phase I and II, and phase III utilized both quantitative and qualitative collection techniques. A multiphase design, used for the dissertation, stressed the complexity policymakers face when defining high quality early education characteristics, and the importance of examining the many facets that contribute to early childhood education.

Phase I

Research Questions

The first phase of the dissertation examined whether providing access to high quality early childhood education programs were positively associated with scoring at or above proficiency on eighth grade mathematics, science, writing, and literacy summative assessments. The proposed research question for phase I was: (1) Will access to high quality early childhood education programs have a positive relationship with, at, or above proficiency eighth grade student mathematics, science, writing, and literacy summative assessment scores compared to scores of students that did not attend an early childhood

education program? To answer the quantitative question of phase I, this research used an ordinary least squares (OLS) model to examine newly released data (May, 2016) from the Annie E. Casey Foundation Annual Kids Count Data Center.

Data and Samples

The dissertation used data from the Annie E. Casey Foundation Annual Kids Count Data Center in which participant mathematics, science, writing, and literacy summative assessment scores from each state in the United States were extracted for analysis. All participating individuals attended the eighth grade, and therefore tested, during the 2014-2015 school year.

Data Analysis

To study the research question guiding this phase, the dependent variable was the percentage of students in each state, respectively, reaching or exceeding proficiency on the mathematics, science, writing, and literacy summative assessment scores the students received on state examinations. The primary independent variable in the first phase of the dissertation was early childhood education attendance. Co-variates of interest were variables correlated to the specified outcomes. These included gender, percentage of families receiving any level of state assistance, race/ethnicity, percentage of families at or below the poverty line, percentage of dropouts, and median income. Phase I utilized OLS to examine whether attending an early childhood education program related to eighth grade summative assessment scores in mathematics, science, writing, and literacy concepts in subsequent grade levels. Table 1 describes the variables, coding, and scales of measurement.

Table 1

Phase I: Variables, Coding, and Scales of Measurement for Phase I

Variables	Coding	Scales of Measurement
Mathematics Score	Percentage at/above Proficiency	Scale
Literacy Score	Percentage at/above Proficiency	Scale
Writing Score	Percentage at/above Proficiency	Scale
Science Score	Percentage at/above Proficiency	Scale
Program Attendance	Percentage of students enrolled in an early childhood education program	Scale
Male	Percentage of males	Scale
Median Family Income	Average income	Scale
Families Receiving Assistance	Percentage of families receiving assistance	Scale
Families at Poverty Line	Percentage of families at or below poverty line	Scale
Drop-Out Rate	Percentage of students dropping out of school	Scale
Student race/ethnicity		
Caucasian	Percentage of Caucasian Students	Scale
African American	Percentage of African American Students	Scale
Asian	Percentage of Asian Students	Scale
Hispanic/Latino	Percentage of Hispanic Students	Scale
Native American	Percentage of Native American Students	Scale
Two or More	Percentage of Students Two or More Races	Scale

Empirical Framework

To test for multivariate outliers, a preliminary regression was run to test Mahalanobis distance in insuring no outliers were present in the sample. After determining that all participants' chi-square ($\chi 2$) critical values are at $p < .001$, no subjects were eliminated, and therefore progression of examination of the data tested for linearity, normality, and homoscedasticity of the residuals. The OLS models used in the study are represented by:

Estimated literacy model.

$$Scores_{LiteracyProf} = \beta_o + \beta_1(X_{Attendance})_t + \beta_2(X_{Male})_{it} + \beta_3(X_{AfricanAmerican})_{it} + \beta_4(X_{Hispanic})_{it} + \beta_5(X_{Asian})_{it} + \beta_6(X_{NativeIndian})_{it} + \beta_7(X_{TwoOrMoreRace})_{it} + \beta_8(X_{PoveryLine})_t + \beta_9(X_{PublicAssist})_t + \beta_{10}(X_{Dropout})_t + \beta_{11}(X_{MedianIncome})_t + €_{it}$$

Estimated writing model.

$$Scores_{WritingProf} = \beta_o + \beta_1(X_{Attendance})_t + \beta_2(X_{Male})_{it} + \beta_3(X_{AfricanAmerican})_{it} + \beta_4(X_{Hispanic})_{it} + \beta_5(X_{Asian})_{it} + \beta_6(X_{NativeIndian})_{it} + \beta_7(X_{TwoOrMoreRace})_{it} + \beta_8(X_{PoveryLine})_t + \beta_9(X_{PublicAssist})_t + \beta_{10}(X_{Dropout})_t + \beta_{11}(X_{MedianIncome})_t + €_{it}$$

Estimated mathematics model.

$$Scores_{MathematicsProf} = \beta_o + \beta_1(X_{Attendance})_t + \beta_2(X_{Male})_{it} + \beta_3(X_{AfricanAmerican})_{it} + \beta_4(X_{Hispanic})_{it} + \beta_5(X_{Asian})_{it} + \beta_6(X_{NativeIndian})_{it} + \beta_7(X_{TwoOrMoreRace})_{it} + \beta_8(X_{PoveryLine})_t + \beta_9(X_{PublicAssist})_t + \beta_{10}(X_{Dropout})_t + \beta_{11}(X_{MedianIncome})_t + €_{it}$$

Estimated science model.

$$Scores_{lScienceProf} = \beta_o + \beta_1(X_{Attendance})_t + \beta_2(X_{Male})_{it} + \beta_3(X_{AfricanAmerican})_{it} + \beta_4(X_{Hispanic})_{it} + \beta_5(X_{Asian})_{it} + \beta_6(X_{NativeIndian})_{it} + \beta_7(X_{TwoOrMoreRace})_{it} + \beta_8(X_{PoveryLine})_t + \beta_9(X_{PublicAssist})_t + \beta_{10}(X_{Dropout})_t + \beta_{11}(X_{MedianIncome})_t + €_{it}$$

Phase II

Research Question

The second phase of the dissertation examined methods to determine whether an early childhood education program is of high quality. This phase examined whether rating early childhood education programs through *Colorado Shines* QRIS would help develop a foundation for an overall higher-quality early childhood education industry. A transformative design was used in which the Joint Committee on Standards for Educational Evaluation Program Evaluation Standards provided an overarching

framework for the study (Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007). The framework determined whether the rating program improved or exacerbated high quality developmental trends of early childhood education programs. The data tested the theory that predicted whether the rating system would negatively, or unjustly, score the early childhood education programs that serve students from low-socioeconomic families compared to the programs that do not accept these students.

The research question addressed in this phase of the study was: (1) Will *Colorado Shines* QRIS reliably and validly rate the overall quality of early childhood education programs that enroll children from families of all socioeconomic levels? To answer the research question, a specific type of Rosenbaum and Rubin's (1983) propensity score matching (PSM) at the program level was utlilized in which programs that accepted students receiving child care assistance funds were set as the experimental variable compared to programs that did not accept students receiving child care assistance funds. A logistic regression first obtained a propensity score value of programs participating in *Colorado Shines* QRIS. Secondly, a nearest neighbor matching method examined and matched the overall distributions of the early childhood education programs' scores. Lastly, a fixed effects model determined if a difference existed in scores between programs that accept students of lower socioeconomic families versus those that do not.

Data and Samples

The Colorado Department of Human Services (DHS), Early Childhood Division categorized the institutions from which the participants came as licensed early childhood education programs and participating members of *Colorado Shines* QRIS. All participating programs were in Colorado, since it is the only state to use *Colorado Shines*. To examine the research question guiding this research, the dependent variable served as

the quality scores, on a scale of one (low-quality) to five (high-quality), the early childhood education programs in Colorado received through *Colorado Shines* QRIS quality raters. The raters based quality scores on the domains of teacher effectiveness and education, curriculum development, infrastructure and maintenance, and program diversity (Colorado Office of Early Childhood, 2015). The primary independent variables of interest were early childhood education program characteristics. These included type of program (child care center, preschool program, or family day care), whether the program accepted families participating in the Colorado Child Care Assistance Program (CCCAP), whether the program was part of the Colorado Preschool Program (CPP), how many languages were spoken at the center, and whether the program accepted infants (or was only preschool level).

Data Collection

In collection of data for the second phase of the study, trends examined high quality rating and improvement scores by examining varying early childhood education programs, ages accepted, private or public characteristics, languages spoken, and student demographic characteristics among Colorado early childhood education programs scored after the inaugural implementation year. Data were extracted from the *Colorado Shines* QRIS public domain database (http://coloradoshines.force.com/search?location), which reported scores throughout the 2015-2016 school year. For alignment of the study, only early childhood education program scores that received a rating of two or higher were examined. Scores of one were excluded, because observers of the scoring system website are unable to determine if the one is an actual score or if the rater scored the program a

one because it is at least licensed through DHS, but a non-participant of *Colorado Shines* QRIS.

Data Analysis

To begin the analysis for the quantitative portion of the study, a division of propensity score matching, called nearest neighbor matching (NNM), was used to estimate the effect of the high quality and improvement rating system policy of *Colorado Shines* QRIS (Rosenbaum & Rubin, 1983). Through matching the covariates - such as CCCAP acceptance, type of program, participation in CPP, ages accepted, and languages spoken – bias produced from confounding variables that cannot be estimated was reduced (Rosenbaum & Rubin, 1983). NNM was the appropriate matching technique to use due to the lack of a true experimental design in the analysis. Programs that participated in CCCAP or CPP chose to participate in the programs, rather than being randomly assigned by *Colorado Shines* QRIS, and by using NNM to account for the quasi-design obtaining valid results were possible.

In preparation to run NNM, covariates CCCAP/non CCCAP, type of program, CPP participation, ages accepted, and languages spoken were categorized into separate groups. Composite type of program was transformed to create dichotomous variables for the categories of Child Care Center, Preschool Program, and Family Day Care. The new dichotomous program type variables were independently labeled as one with the rest of the programs labeled as zero. Child Care Centers were used as the reference variable in the model. Table 2 describes the variables, coding, and scales of measurement.

Table 2

Phase II: Variables, Coding, and Scales of Measurement for Phase II

Variables	Coding	Scales of measurement
Score	Program Score (2-5)	Ordinal
Accepts CCCAP	(1 = Accepts CCCAP, 0 = Does not Accept CCCAP)	Nominal, Percent
Type of program		Nominal, Percent
Child Care Center	(1 = Child Care Center, 0 = Non Child Care Center)	Nominal, Percent
Preschool Program	(1 – Preschool Program, 0 – Non Preschool Program)	Nominal, Percent
Family Day Care	(1= Family Day Care, 0 = Non Family Day Care)	Nominal, Percent
Independent of Colorado Preschool Program (CPP)	(1= Non CPP Program, 0 = CPP Program)	Nominal, Percent
English speaking only	(1 = English Only, 0 = English + Additional Language(s)	Nominal, Percent

Empirical Framework

To test for multivariate outliers, a preliminary logistic regression was run to obtain propensity score values (Ln(p/1-p)) (Garrido et al., 2014). The logistic regression model used in the study is represented by:

Estimated logistic regression model.

$$\text{Ln}(p/1\text{-}p) = \beta_0 + \beta_1(X_{CCCAP})_{it} + \beta_2(X_{AGES})_{it} + \beta_3(X_{CPP})_{it} + \beta_4(X_{LANGUAGE})_{it} + \beta_5(X_{PRESCHOOL})_{it} + \beta_6(X_{FAMILYDAY})_{it} + \epsilon_{it}$$

To check that the nearest neighbor value (Ln(p/1-p) was balanced across the programs that accept CCCAP students versus the programs that do not, and that the covariates were balanced across the treatment and comparison groups within the strata of the propensity score, a standardized differences model was used to examine distributions (Cayton, 2008). The standardized differences model used in the study is represented by:

Estimated standardized difference model.

$$SSMD\ (\beta) = \frac{\mu - \mu_2}{\sqrt{(\delta_1^2+\delta_2^2)}}$$

After determining through the results that the matchings were a strong control through the standardized difference model, the next step was to match each participating CCCAP early childhood education program to one or more nonparticipating CCCAP early childhood education programs on the propensity score. To do this, Cayton's (2008) nearest neighbor matching method was run, instead of the exact matching method, because the *Colorado Shines* QRIS reporting website does not provide exact percentages of the covariates reported (e.g. the website only reports that an early childhood education program accepts CCCAP, but not exact percentages of families involved in the CCCAP program). The nearest neighbor matching models used in the study are represented by:

Estimated nearest neighbor matching model:

$$\tau_1 = E(y_1 - y_0)$$

$$\delta_1 = E(y_1 - y_0|t = 1)$$

$$NNM = (X - x\ ^0 1_n) *W(X - x\ ^0\ P\ 1_n)\ n\ _i w_i - 1$$

The newly adjusted model, therefore, verified that the weighted score (W) for the nearest matching neighbors were balanced across the treatment and comparison groups in the weighted programs, and that through calculations of Mahalanobis distance, no new outliers arose (Garrido et al., 2014).

The last step was to use a multivariate analysis based on the adjusted sample from nearest neighbor matching of groupings. Because multiple matches for a single treated observation were present, fixed effects was used, rather than a logistic regression, due to the newly weighted samples (Gelman & Hill, 2006). The fixed effects model (standard

errors clustered on type of program (child care/preschool/family child care) used in the study was represented by:

Estimated fixed effects model.

$$Scores_{rating} = \alpha_i + \beta_1(X_{CCCAP})_{it} + \beta_2(X_{AGES})_{it} + \beta_3(X_{CPP})_{it} + \beta_4(X_{LANGUAGE})_{it} + \epsilon_{it}$$

Phase III

Research Design

The third phase of the dissertation called for the embedding of quantitative methods into qualitative methods, using multiple variables and sampling techniques in selecting lead early childhood education teachers at local preschool organizations. In the embedded mixed methods design, qualitative and quantitative data was collected across two phases (Patton, 2013). To answer the qualitative research questions, a case study approach was utilized, because the study involved research within a real-life, contemporary context (Yin, 2009). The qualitative research questions identified for this case study were: (1) Do preschool teachers believe that teachers who earned a bachelor's degree are more effective than those who do not have a bachelor's degree? (2) Do directors of preschool programs believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree? and (3) Do parents of preschool children believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree? To answer the quantitative research question, Hierarchical Linear Modeling (HLM) was utilized, because the participant, procedure, and results of the study were nested (Maas & Hox, 2005). The quantitative research question that was identified for phase III was: (1) Is having a preschool teacher with a bachelor's degree a significant predictor for success in

mathematics and literacy school readiness as measured by the Colorado Department of Education endorsed *TS Gold* assessment? Teacher effectiveness was measured by student success as defined through school readiness scores provided by the Colorado Deparment of Education Results Matter database.

Data Sources

The institutions from which the participants came are categorized by the Colorado Department of Human Services, Early Childhood Division, as licensed preschool programs. With at least 70% of the students participating in the free lunch program, both programs included students from families identified in the lower socioeconomic group.

The participants selected for the qualitative portion of phase III included two preschool teachers who have earned bachelor's degrees; two teachers who have not earned bachelor's degrees but satisfied the Colorado Department of Human Services, Early Childhood Division, qualifications to become an early childhood education teacher; two parents; and two directors of preschool programs. One director came from a preschool program that requires at least half of the lead preschool teachers to earn bachelor's degrees and one director came from a preschool program that does not require the lead preschool teachers to earn bachelor's degrees. Likewise, one parent had a child taught by a preschool teacher who earned a bachelor's degree and one parent had a child taught by a preschool teacher who did not earn a bachelor's degree. The variation among participants is displayed in Table 3.

Table 3

Phase III: Participant Variation of Preschool Directors, Teachers, and Parents Interviewed and Observed

Participant number	Position	Earned Degree	Years Ex	50% of Lead teachers at school need bachelor's degrees	Believe teachers should earn bachelor's degree	Quote
1*	Director	Yes	< 5 years	Yes	Yes	I would love to have all teachers who had the commitment and the investment to get a degree.
2*	Director	Yes	>15 years	No	Yes	If I think about the way you communicate with those kids, with your co-workers – then yes, a degree is important.
3•	Teacher	Yes	>15 years	No	No	I think some sort of classroom experience is just as valid as all the education you can get. I don't think preschool teachers are paid according to what a bachelor's degree costs.
5*	Teacher	No	>20 years	Yes	No	I feel the way the current system is now is working. As long as teachers have hands on learning. And, they do have the knowledge of how to work with the children.
6•	Teacher	No	>15 Years	No	Yes	I think with a degree, teachers have more ideas and teaching is easier for them.
7*	Parent	N/A	N/A	Yes	Yes	I feel teachers should at least understand the state requirements to be a preschool teacher.

Participant number	Position	Earned Degree	Years Ex	50% of Lead teachers at school need bachelor's degrees	Believe teachers should earn bachelor's degree	Quote
8*	Parent	N/A	N/A	No	No	I think in society, people put emphasis on education. However, I think if any teacher can respond to the needs of a child, and they are able to convey the lesson, then I don't know if it really matters.

Note. • Denotes participant who were interviewed and observed. *Denotes participant who were interviewed.

Using Hierarchial Linear Modeling (HLM) in the quantitative portion of the study, student skill scores in the mathematics and literacy portions of the *TS Gold* school readiness assessment were compared between preschool teachers who earned a bachelor's degree and preschool teachers who have not earned a bachelor's degree. Before analysis, the student skill scores were transformed into *z*-scores, because most preschool programs have combined three- and four-year-old students in a single classroom. The scoring scale was slightly lower for the three-year-old cohort, so in order to be able to compare the entire classroom together, transformation to *z*-scores was critical. Only the baseline mathematics and literacy student *z*-scores were used as Level 1 variables since individual student demographic data was not available due to identity protection by the preschool programs. Teacher degree status, classroom size, classroom

gender percentage, classroom IEP status percentage, classroom ESL status percentage, and classroom race/ethnicity percentage was used as Level 2 variables.

Data Collection

To collect data for the qualitative portion of phase III, maximum variation purposeful/criterion-based sampling was employed as teachers, parents, and directors of the preschool classrooms were invited to participate to ensure a holistic experience of the preschool teaching experience. After obtaining written consent from each director of the preschool programs to contact her teachers and parents, and through IRB permission (Appendix A), individual interviews were conducted using a semi-structured interview protocol adapted from the work of Creswell (2013). This approach allowed exploration into the participants' experiences of teaching, directing, or parents' enrolling a child in preschool programs of teachers with or without a bachelor's degree; provided flexibility to develop relationships with participants around the experiences being discussed; and allowed for probes and follow-up questions during the interviews (Appendix B).

Additional qualitative data collection for phase III included two formal observations in which participant observer protocol was launched (Labaree, 2002). The teaching style of one preschool teacher who earned a bachelor's degree was observed, and the teaching style of one non-degree preschool teacher was observed. The preschool teacher who earned a bachelor's degree was observed in a 30-minute circle time activity. The preschool teacher without a bachelor's degree was observed in a 30-minute art/science activity on the human body. The two participating teachers' classrooms were visited a total of three hours, on different days, for the teacher to become comfortable with researcher presence. The two formal recorded observations of each teacher lasted 30

minutes. During this observation, the date and time, where the observation took place, who was present, a description of the teacher's classroom, the social interactions of the teacher and her students, what activities transpired, and the feelings and emotions of the experience were referenced in the fieldnotes (Appendix C).

For the quantitative portion of phase III, lead preschool teachers' student mathematics and literacy school readiness scores reflecting teacher effectiveness were collected from the Results Matter database for the *TS Gold* assessment. School readiness scores from *TS Gold* were selected, because it is the assessment program the Colorado Department of Education (CDE) endorsed to collect student scores in preschools across the state of Colorado prescribed for the School Readiness/Results Matter initiative of RRT-ELC (Colorado Office of Early Childhood, 2015). Only secondary analysis of these scores was examined for the teacher scores came from schools already participating in the Results Matter initiative. Therefore, no additional work for teachers of this portion of the dissertation was required. Through permission of the preschool directors participating in the phase, retrospective data was extracted from the mandatory 2015 CDE May reporting period. The classroom data accessed was already de-identified by the preschool programs since their respective results were sent to the CDE in de-identified format.

Qualitative Framework

Following transcription of the interview and observation data in the qualitative portion of phase III, an inductive approach of data analysis called thematic content analysis was utilized to review the data for themes and patterns related to the research questions of the study (Silverman, 1993). Additionally, data analysis strategies promoted by Stake (1995) and Silverman (1993) were used. The data was coded using Silverman's

technique, an inductive approach of data analysis called thematic content analysis to review the data for themes and patterns related to the research questions of the first phase of the dissertation. To organize the thematic codes found in Silverman's technique, Stake's (1995) four-step process to report the themes was followed.

Cycle 1: Initial read-through, with attribute coding. Silverman (1993) stated that good qualitative research needs to be able to draw interpretations and be consistent with the data that is collected. An initial read through process was completed using the basic concepts of thematic content analysis, because the process allowed detection and identification of factors or variables that would potentially influence any issues generated by the participants. Therefore, the participants' interpretations were significant in terms of giving the most appropriate explanations for their behaviors, actions and thoughts.

Cycle 2: Provisional coding using propositions and macro-codes. In the second cycle, the flexibility of thematic content analysis helped incorporate both inductive and deductive methodologies in analyzing the data (Frith & Gleeson 2004; Hayes 1997). Using a deductive approach in Cycle 1, broader generalizations were established by examination of precise content in Cycle 2. This assisted in ensuring the themes were effectively linked to the data (Patton, 2013). This connectivity also assisted in incorporating the observational data that was collected throughout the study into the overall themes. Furthermore, for comparing the observational data collected with the perceptions of the participants in the interviews, the inductive approach of thematic content analysis to prepare for Cycle 3 was utilized.

Cycle 3: Inductive sub-coding. In Cycle 3, inductive sub-codes were developed as an additional read through of the data was completed. Thematic content analysis was

used once again when grouping associated data that was gathered in the research at multiple collection dates. Coded collections of data, identifying similar categories, and examination of patterns and themes at the various collection times were established. During this cycle, identification of patterns and categories, fuse codes, and amalgamation of new findings occurred.

Cycle 4: Deeper theoretical coding. One important step in thematic content analysis is that the themes need to be evaluated to ensure they represent the whole of the text (Silverman, 2013). Miles and Huberman (1994) said that validating themes in the early and late stages of data analysis was essential. At the end of this stage, conflicting results with respect to any themes which were added or removed by outside and independent reviewers were exposed (Miles & Huberman 1994; Hosmer 2008).

In Silverman's technique, data was coded as a comprehensive process in which identification of numerous cross-references between the data and the evolving themes was established (Silverman, 1993, Hayes, 1997). Like Stake, the method provided flexibility for approaching research patterns in both inductive and deductive ways (Frith & Gleeson, 2004; Hayes, 1997; Myers, 1997). For this phase of the dissertation, both inductive and deductive analysis throughout data collection and analysis, code in cycles, and frequent reflection and code revision throughout the entire data collection process was conducted. The reported thematic content mapping of the participant interviews and observations is displayed in Table 4.

Table 4

Phase III: Reported Thematic Content Mapping Table for Interviews and Observations

Positive modeling of the preschool teacher in the classroom	Feasibility of policy change for bachelor's degree acquisition

T/Preschool Teacher = D/Director = P/Parents =	T/Preschool Teacher = D/Director = P/Parents =
TPD/Content acquisition	TDP/Repute of degree
TDP/Hands-on-learning	TD/Cost of employment
TDP/Knowledge of standards	TD/Cost of school
TDP/Interaction with students	P/Tuition rates
D/Interaction with parents	TD/Impact of student teaching
TD/Confidence to instruct	TD/Time required for student teaching
D/Ability to collaborate	TDP/Structural pressures
TD/Utilizes resources	TD/New expectation roles
TDP/Cares for students -passion	
D/Successful working relationships	

Multiple verification strategies were used to ensure the results of the study were credible, transferable, dependable, and confirmable (Anfara, Brown, & Mangione, 2011). To ensure the results are credible, confirmable and dependable, triangulation was employed by means of using multiple and different sources to provide corroborating evidence on the theme and perspectives of the phase, and member checks by soliciting three participants' views of the credibility of the findings and interpretations. After reading the results of the qualitative portion of phase III, the three participants supported the findings. To ensure transferability, thick, rich description was used to project that the varying schools in this phase were indicative of a larger preschool population. This thick, rich description, in-turn, will afford readers of the study and members of the preschool educational system to transfer these results to other types of preschool programs (Geertz, 1978).

Quantitative Framework

Using Hierarchial Linear Modeling (HLM) in the quantitative portion of phase III, student skill *z*-scores in the mathematics and literacy portions of the *TS Gold* assessment were compared. These skill *z*-scores served as the dependent variable of the phase III.

Each piece of classroom data was analyzed through evaluating the scores against the desired outcomes set forth by the assessment program in classrooms led by teachers who earned bachelor's degrees versus lead teachers who have not earn bachelor's degrees.

The following mathematics variables—each student's score for number concepts and operations in counts, quantities, and numerals; exploring and describing spatial relationships and shapes; comparing numbers and measures; and knowledge of patterns—were summed for a total score. This method was used for the following literacy variables: demonstrating phonological awareness, knowledge of the alphabet print and its uses, and emergent writing skills; and comprehension and responding to books and other texts. After the scores in each subject are totaled and transformed into *z*-scores, student classifications of scores were coded as scale variables in this study. Teacher degree status, in addition to the remaining covariates, was coded as nominal variables in the study.

Mathematics and literacy proficiency were each independently analyzed using HLM to determine if the scores differed between teachers with bachelor's degrees versus teachers without bachelor's degrees. Further classroom covariates of race/ethnicity, IEP status, and ESL classification were categorized into separate groups. Composite race/ethnicity was transformed to create dichotomous variables for the categories of Asian, African American, Hispanic, Caucasian, Multi-racial, and unknown-race students. The new dichotomous race variables were independently labeled as one with the rest of the race variables labeled as zero (e.g., 1 for Caucasian, 0 for other). Caucasian students were used as the reference variable in the model. Table 5 describes the variables, coding, and scales of measurement.

Table 5

Phase III: Variables, Coding, and Scales of Measurement for Phase III

Variables	Coding	Scales of measurement
Teacher degree status	(1 = Non Degree, 0 = degree)	Nominal, Percent
Classroom size	Number of Students	Scale
Sex	(1 = Male, 0 = Female)	Nominal, Percent
Individualized education program (IEP) status	(1 = Non IEP, 0 = IEP)	Nominal, Percent
English as a second language (ESL) status	(1 = Non ESL, 0 = ESL)	Nominal, Percent
Student mathematics *z*-score	Sum of scores	Scale
Student literacy *z*-score	Sum of scores	Scale
Student race/ethnicity		
Asian	(1 = Asian, 0 = Other)	Nominal, Percent
African American	(1 = African American, 0 = Other)	Nominal, Percent
Hispanic	(1 = Hispanic, 0 = Other)	Nominal, Percent
Caucasian	(1 = Caucasian, 0 = Other)	Nominal, Percent
Multi-race	(1 = Multi-race, 0 = Other)	Nominal, Percent
Unknown race	(1 = Unknown, 0 = Other)	Nominal, Percent

Due to the standard testing window of the assessment remaining open two weeks for teachers to import scores into the Results Matter database, there was no missing data to report, because all teachers scored every student in her classroom. To test for multivariate outliers, a preliminary regression test was run to calculate Mahalanobis distance to insure no outliers were present in the sample. After determining that all participants' chi-square ($\chi 2$) critical values are at $p < .001$, there was need to eliminate any subjects and therefore the examination moved on to test for linearity, normality, and homoscedasticity of the residuals. The HLM models used in phase III for mathematics score outcomes are represented by:

HLM model for mathematics score outcomes.

Level 1 model.

$$(MATHSCORE_{ij}) = \beta_{0j} + €$$

Level 2 model.

$$\delta_{0j} = \beta_0 + \beta_1(X_{TeacherDegree}) + \beta_2(X_{Sex}) + \beta_3(X_{AfricanAmerican}) + \beta_4(X_{Hispanic}) + \beta_5(X_{Asian}) + \beta_6(X_{NativeIndian}) + \beta_7(X_{MultiRace}) + \beta_8(X_{Unknown}) + \beta_9(X_{ESL}) + \beta_{10}(X_{IEP}) + \beta_{11}(X_{ClassSize}) + €$$

The HLM models used in phase III for literacy score outcomes are represented by:

HLM model for literacy score outcomes.

Level 1 model.

$$(LITSCORE_{ij}) = \beta_{0j} + €$$

Level 2 model.

$$\delta_{0j} = \beta_0 + \beta_1(X_{TeacherDegree}) + \beta_2(X_{Sex}) + \beta_3(X_{AfricanAmerican}) + \beta_4(X_{Hispanic}) + \beta_5(X_{Asian}) + \beta_6(X_{NativeIndian}) + \beta_7(X_{MultiRace}) + \beta_8(X_{Unknown}) + \beta_9(X_{ESL}) + \beta_{10}(X_{IEP}) + \beta_{11}(X_{ClassSize}) + €$$

To participate in Results Matter, all teachers were required by the Colorado Department of Education to become certified by *TS Gold* in interrater reliability through extensive training (Colorado Office of Early Chidhood, 2015). Teachers must have successfully completed a national level interrater examination to score students.

Validity Considerations

For all qualitative data collection in the third phase of the dissertation, cross-case synthesis was used throughout the analysis of individual interviews and observations to examine whether the themes determined were instances of similar or different thought processes of the early childhood education practitioners (Hayes, 1997). Miles and Huberman (1994) highlighted the flexibility of this approach by stating it is the ideal

analysis method to use when the researcher is forced to collect data at different times. Multiple verification strategies were used to ensure the results of the study are credible, transferable, dependable, and confirmable (Anfara, Brown, & Mangione, 2011). One important step in Silverman's (1993) technique stated in thematic content analysis was that the themes need to be evaluated to ensure they represent the whole of the text. Miles and Huberman (1994) also reinforced that validating themes in the early and late stages of data analysis was essential. Per the researchers' instruction, outside reviewers were involved during multiple stages to evaluate the identified themes. An independent reviewer was also asked for feedback. This enabled comparison of the two sets of feedback (Miles & Huberman, 1994). The main purpose of this procedure was to "build reliability in themes analysis coding" (Hosmer, 2008, p.52). At the end of this stage, any conflicting reports with respect to any themes were added or removed by outside and independent reviewers will arise (Miles & Huberman 1994; Hosmer 2008).

Limitations

To avoid conflict of interest, clarification of research bias was made to the participants by commenting on past experiences, jobs, and current roles in preschool policy development that likely shaped reseacher interpretation and approach to the study. Limitations present in the first phase of the research are found in the singular early education year cohort collected. A stronger study would include a continuance of cohorts that are collected for longer than just one year. An additional significant limitation exists in the collection of data present only in the preschool cohort. Early childhood education encompasses infant, toddler, preschool, and pre-kindergarten levels. Therefore, to strengthen this study, a data set reporting scoring and surveys including infant and

toddlers are necessary. The primary limitation associated with the second phase of the dissertation similarly includes the lack of reported data incorporating multiple years. A stronger study would encompass the inclusion of multiple years in which the program rated early childhood education programs to examine trends throughout time. The limitation of the final phase additionally collected student scores between varying teachers in the inaugural year of Results Matter *TS Gold* expansion implementation. A stronger study would examine trends over a series of years. A further limitation of the third phase is the examination of students in only one socioeconomic bracket pulled from the state of Colorado. As a recipient of RTT-ELC, Colorado acquired grants to implement an assessment system to examine the progress of developmental characteristic of students in early childhood education programs. Therefore, data, such as the data present in Results Matter is not collected in other states. A stronger study would include teacher scores of students in all socioeconomic brackets throughout the entire country if, or when, other states adopt similar programs.

Summary

In conclusion, this chapter described the methods used for all phases of the dissertation. In summary, the specific phases are: I. To examine the relationship access to early childhood education provides in school readiness for primary and secondary education grades; II. To identify the validity and reliability metrics of *Colorado Shines* QRIS that quantifies and scores high quality characteristics of early childhood education programs in the state of Colorado; III. To discover the impact of early childhood teacher education when creating a high quality early education experience. This methods chapter strove to stress importance of the complexity policymakers face when defining high

quality early education characteristics, and the importance of examining the many facets that contribute to early childhood education.

CHAPTER IV

RESULTS

The focus of this study was to explore the importance of high quality early education in later secondary education development, help examine newly adopted programs designed to classify and quantify quality in early childhood education programs, and examine how teacher education contributes to quality of early childhood education programs. In review, the specific phases are: I. To examine the relationship access to early childhood education provides in school readiness for primary and secondary education grades; II. To identify the validity and reliability metrics of *Colorado Shines* QRIS that quantifies and scores high quality characteristics of early childhood education programs in the state of Colorado; III. To discover the impact of early childhood teacher education when creating a high quality early education experience. The following results section reports the findings of each phase of the dissertation.

Phase I

In the Phase I findings, examination of the long term contributions of early childhood education was reported and analyzed. Whereas multiple researchers have already presented proof that early childhood education attendance correlates to higher adult income, greater housing stability, reduction in prison incarceration, and less governmental assistance; this phase of the dissertation contributed to the early childhood education research community by examining how far the contributions of early childhood education extend into primary and secondary education. Phase I of the dissertation examined whether early childhood education attendance benefits outspread into eighth

grade state summative scores in the routine science, math, literacy, and writing subjects by using an Ordinary Least Squares modeling technique.

Phase I Descriptive Statistics

Among the 50 states and Washington DC, the average percent of students scoring at or above proficiency in mathematics was 32.84% (*SD*=7.58), and below proficiency was 67.13% (*SD*=7.59). The average percent of students scoring at or above proficiency on literacy was 33.77% (*SD*=6.21), and below proficiency was 66.23% (*SD*=6.14). The average percent of students scoring at or above proficiency in writing was 30.45% (*SD*=7.30), and below proficiency was 69.55% (*SD*=7.28). Lastly, the average percent of students scoring at or above proficiency in science was 29.74% (*SD*=8.41), and below proficiency was 70.26% (*SD*=8.42). When examining the overall percentage of students, 46.92% (*SD*=8.66) of all eligible students were enrolled in some type of early childhood education program. The division of males versus females enrolled in early childhood education programs accounted to 51.10% (*SD*=0.24) male and 48.98% (*SD*=0.26) female. The average medium income of families that had children enrolled in early education programs was $66,494 (*SD*=11,830), and of those families 27.00% (*SD*=6.15) received some level of financial assistance, and 50.64% (*SD*=7.84) were at or below the poverty line. In the entity of the states, the drop-out percentage of students who were previously enrolled in early childhood education program was 7.64% (*SD*=2.60). Of all the students' scores collected in the study, 59.98% (*SD*=17.83) were Caucasian, 12.72% (*SD*=12.32) were African American, 3.72% (*SD*=3.72) were Asian, 16.88% (*SD*=13.05) classified as Hispanic, 2.09% (*SD*=3.72) identified as Native American, and 4.74%

(*SD*=3.98) were two or more races. The descriptive statistics for the summative assessment scores are displayed in Table 6.

Table 6

Phase I: Summative Assessment Scores, Attendance of Early Childhood Education Programs, and Covariates Percentages by State

Variables	*N*	Mean	*SD*
Mathematics Percentages			
Above or at Proficiency	51	32.84	7.58
Below Proficiency	51	67.13	7.59
Literacy Percentages			
Above or at Proficiency	51	33.77	6.21
Below Proficiency	51	66.23	6.14
Writing Percentages			
Above or at Proficiency	51	30.45	7.30
Below Proficiency	51	69.55	7.28
Science Percentages			
Above or at Proficiency	51	29.74	8.41
Below Proficiency	51	70.26	8.42
Enrollment Percentage	51	46.29	8.66
Gender			
Male	51	51.10	0.24
Female	51	48.98	0.26
Median Family Income	51	66,494	11,830
Percentage of Families Receiving	51	27.00	6.15
Assistance	51	50.64	7.84
Percentage of Families at Poverty Line	51	7.64	2.60
Drop-Out Percentage			
Race/Ethnicity			
Caucasian	51	59.98	17.83
African American	51	12.72	12.32
Asian	51	3.72	3.74
Hispanic/Latino	51	16.88	13.05
Native Indian/Alaskan Indian	51	2.09	3.72
Two or More Ethnicities	51	4.74	3.98
Valid *N* (Pairwise)	51		

Science Scores

Early childhood education attendance percentage points did not appear to have any effect on eighth grade science at or above proficiency scores. Of the covariates in the model, two variables proved significance. For every one percent increase in unemployment percentages, the average number of students at or above proficiency on state science summative assessments decreased by 2.237 percent (p=.008). Additionally, for every thousand-dollar increase in median income, percent proficient in science increases by .1 percent (p=.006). Table 7 represents the findings for the OLS model of early childhood education attendance and science summative assessment scores.

Table 7

Phase I: Trends between Early Childhood Education Attendance and State Science Summative Assessment Scores

	Coeff	*SE*	*p*
Attended an Early Education Program	0.064	0.129	0.623
Male	6.226	3.252	0.064
Native American/Indian	0.914	0.535	0.096
Asian	0.224	0.395	0.575
African American	-0.088	0.307	0.776
Hispanic	-0.038	0.311	0.904
Two or More Races	-0.488	0.710	0.381
Poverty Level	0.527	0.362	0.496
Drop Out Rate	0.448	0.403	0.154
Unemployment Rate	-2.237	0.791	0.008*
Public Assistance	0.193	0.153	0.138
Median Income	0.001	0.001	0.006*
Intercept	31.779	17.154	0.000

Note. All values are in percent.
*Denotes p<0.050 significance.

Mathematics Scores

Early childhood education attendance percentage points appeared to improve eighth grade mathematics at or above proficiency state assessment scores. Of the covariates in the model, four variables proved significance. For every one percent increase in early education attendance percentages, the average number of students at or above proficiency on state mathematics summative assessments increased by 0.265 percent (p=.021). For every one percent increase in drop-out rates, the average number of students at or above proficiency on state mathematics summative assessments decreased by 0.754 percent (p=.015). For every one percent increase in average percent of Asian students, the average number of students at or above proficiency on state mathematics summative assessments increased by 0.872 percent (p=.017). Lastly, for every thousand-dollar increase in median income, percent proficient in mathematics increases by .5 percent (p=.015). Table 8 represents the findings for the Ordinary Least Squares model of early childhood education attendance and mathematics state summative assessment scores.

Table 8

Phase 1: Trends between Early Childhood Education Attendance and State Mathematics Summative Assessment Scores

	Coeff	*SE*	*p*
Attended an Early Education Program	0.265	0.109	0.021*
Male	0.926	1.708	0.591
Native American/Indian	0.149	0.364	0.685
Asian	0.872	0.348	0.017*
African American	0.258	0.319	0.422
Hispanic	0.287	0.309	0.360
Two or More Races	-0.076	0.524	0.885
Poverty Level	0.218	0.344	0.530

	Coeff	*SE*	*p*
Drop Out Rate	0.754	0.270	0.008*
Unemployment Rate	-0.789	0.828	0.347
Public Assistance	0.094	0.146	0.521
Median Income	0.005	0.002	0.015*
Intercept	30.564	2.466	0.000

Note. All values are in percent.
*Denotes p<0.050 significance.

Literacy Scores

Early childhood education attendance percentages did not appear to have any effect on eighth grade literacy at or above proficiency scores. Table 9 represents the findings for the OLS model of early childhood education attendance and literacy summative assessment scores.

Table 9

Phase I: Trends between Early Childhood Education Attendance and State Literacy Summative Assessment Scores

	Coeff	*SE*	*p*
Attended an Early Education Program	0.105	0.104	0.316
Male	3.862	2.059	0.069
Native American/Indian	0.516	0.302	0.096
Asian	0.031	0.389	0.937
African American	-0.168	0.270	0.538
Hispanic	-0.059	0.260	0.825
Two or More Races	-0.127	0.527	0.811
Poverty Level	0.017	0.320	0.956
Drop Out Rate	0.265	0.417	0.529
Unemployment Rate	0.581	0.812	0.479
Public Assistance	0.071	0.133	0.598
Median Income	0.003	0.001	0.100
Intercept	18.474	10.832	0.000

Note. All values are in percent.
*Denotes p<0.050 significance

Writing Scores

Early childhood education attendance percentages appeared to have a positive effect on eighth grade writing above or at proficiency scores. Of the covariates in the model, only the primary variable proved significance. In relation to the reference variable used in the model, early childhood education attendance appeared to assist overall students in scoring at or above proficiency percentages of writing scores. For every one percent increase in early education attendance percentages, the average number of students at or above proficiency on state writing summative assessments increased by 0.368 percent (p=.008). Table 10 represents the findings for the OLS model of early childhood education attendance and writing summative assessment scores.

Table 10

Phase I: Trends between Early Childhood Education Attendance and State Writing Summative Assessment Scores

	Coeff	*SE*	*p*
Attended an Early Education Program	0.368	0.132	0.008*
Male	3.575	2.541	0.168
Native American/Indian	0.267	0.409	0.517
Asian	-0.112	0.503	0.829
African American	0.124	0.371	0.739
Hispanic	0.138	0.361	0.704
Two or More Races	0.628	0.676	0.676
Poverty Percentage	0.333	0.346	0.342
Drop Out Rate	0.110	0.220	0.619
Unemployment Rate	0.642	0.737	0.389
Public Assistance Percentage	0.055	0.180	0.759
Median Income	0.003	0.002	0.068
Intercept	30.227	7.166	0.000

Note. All values are in percent.
*Denotes p<0.050 significance

Phase II

The purpose of Phase II sought to determine the validity and reliability metrics of *Colorado Shines* QRIS that quantifies and scores high quality characteristics of early childhood education programs in the state of Colorado.

Phase II Descriptive Statistics

State descriptive statistics for *Colorado Shines* QRIS included an overall quality rating score average of 2.89 (*SD*=0.90). Of the programs sampled (*N*=609), 39.5% (*SD*=0.49) of the programs are located in Denver, 12.5% (*SD*=0.33) are in Colorado Springs, 28.2% (*SD*=0.45) are located in Northern Colorado, 8.2% (*SD*=0.27) are on the Western Slope, 8.2% (*SD*=0.25) are located in the Greater Denver Region, and 3.4% (*SD*=0.18) are in Southern Colorado. Of all the programs in the state, 51% (*SD*=0.50) were traditional child care centers, 42% (*SD*=0.49) were classified as preschool programs, and 7% (*SD*=0.26) identified as family day cares. Of the early childhood education programs participating in the study, only 37% (*SD*=0.48) accepted families participating in the Colorado Child Care Assistance Program (CCCAP), whereas 63% (*SD*=0.51) identified as being part of the Colorado Preschool Program (CPP). Additionally, 74% (*SD*=0.81) of the programs only spoke English as the program's primary language, and only 13% (*SD*=0.34) accepted infants. In further analysis of Phase II descriptive statistics, individual regions of Colorado were further broken as to provide a comparison among the scores in the differing regions of Colorado. The descriptive statistics of the participating early childhood education programs are displayed in Table 11.

Table 11

Phase II: Early Education Programs and Covariates

Variables	*N*	Mean	*SD*
State Average Score	609	2.89	0.90
Denver Average Score	241	3.42	0.34
Colorado Springs Average Score	76	2.70	0.88
Northern Colorado Average Score	172	2.13	0.90
Western Colorado Average Score	50	2.87	0.45
Greater Denver Region Average Score	50	2.92	0.90
Southern Colorado Average Score	20	2.40	0.78
Accepts CCCAP	609	37.44	0.48
Type of program			
Child Care Center	609	51.00	0.50
Preschool Program	609	42.00	0.49
Family Day Care	609	26.00	0.26
Part of Colorado Preschool Program (CPP)	609	63.71	0.51
English Speaking Only	609	74.05	0.81
Accepts Infants	609	13.63	0.34
Valid *N* (listwise)	609		

To examine if there were any scoring differences among all the regions in Colorado for participating early childhood education programs in *Colorado Shines* QRIS, individual regions were analyzed before examining the entire state. Results from Phase II are individually reported in independent regions for Denver, Colorado Springs, Northern Colorado, the Western Slope, the Greater Denver region, and Southern Colorado before the results were examined for the entire state of Colorado.

Denver Results

A fixed effects model was utilized to determine if a difference existed in scores between programs that accepted students of lower socioeconomic families versus those that did not, programs that are part of the Colorado Preschool Program (CPP) versus those that are not, and programs that accept infants versus those that do not. Of the

covariates in the fixed effects model, five variables proved significance. Programs that were not part of CPP scored 0.886 points fewer (p=.003), on average, compared to programs participating in CPP. Early childhood education programs that accepted CCCAP students scored 0.254 points fewer (p=.031), on average, than programs that did not accept CCCAP students. Additionally, programs that accepted infants (nontraditional preschools) scored 0.127 points fewer (p=.050), on average, compared to programs that did not accept infants. Table 12 represents the findings for the fixed effects model of Denver programs.

Table 12

Phase II: Scoring Trends between Denver Early Childhood Education Programs

	Coeff	*SE*	*p*
Languages Spoken	0.047	0.082	0.604
Non CPP	-0.886	0.096	0.003*
CCCAP	-0.254	0.066	0.031*
Programs that accept infants	-0.127	0.041	0.050*
Intercept	3.421	0.069	0.000

Note. *Denotes p<0.050 significance

Colorado Springs Results

In the second region separately analyzed, Colorado Springs results were run to determine if a difference existed in scores between Colorado Springs programs that accepted students part of the CCCAP versus programs that did not accept students who received assistance through CCCAP. Of the covariates in the fixed effects model, only one variable exhibited significance. Early childhood education programs that were not part of the Colorado Preschool Program scored 1.21 points fewer (p=.000), on average, compared to the programs that identify as Colorado Preschool Program early childhood

education schools. In comparison to Denver, programs that accepted CCCAP students did not significantly score any differently than programs that do not accept CCCAP students. Table 13 represents the findings for the fixed effects model of Colorado Springs results.

Table 13

Phase II: Scoring Trends between Colorado Springs Early Childhood Education Programs

	Coeff	*SE*	*p*
Languages Spoken	-0.420	0.266	0.117
Non CPP	-1.209	0.250	0.000*
CCCAP	-0.022	0.066	0.862
Programs that accept infants	-0.033	0.090	0.405
Intercept	2.697	0.286	0.000

Note. *Denotes $p<0.050$ significance

Northern Colorado Results

In the third region separately analyzed, Northern Colorado results were run to determine if a difference existed in scores between Northern Colorado programs that accept students from families of lower socioeconomic brackets compared to programs that do accept students from families of lower socioeconomic brackets. Of the covariates in the fixed effects model, every variable exhibited significance. Early childhood education programs that accept families who need CCCAP assistance scored 1.20 points fewer (p=.007), on average, than programs that do not accept families with CCCAP assistance. Additionally, programs that were not part of the Colorado Preschool Program scored 1.28 points fewer (p=.000), on average, compared to the programs that identify as Colorado Preschool Program early childhood education schools. Programs that marketed to students that do not speak English as a primary language scored 0.839 points fewer

(*p*=.014), on average, than programs that only speak English. Lastly, programs that accept infants scored 1.50 points lower (*p*=.001), on average, than programs that only accept preschool aged students. Table 14 represents the findings for the fixed effects model of Northern Colorado results.

Table 14

Phase II: Scoring Trends between Northern Colorado Early Childhood Education Programs

	Coeff	*SE*	*P*
Languages Spoken	-0.839	0.192	0.014*
Non CPP	-1.280	0.092	0.000*
CCCAP	-1.202	0.435	0.007*
Programs that accept infants	-1.504	0.445	0.001*
Intercept	2.127	0.570	0.000

Note. *Denotes p<0.050 significance

Western Slope Results

In the fourth region analyzed, the Western Slope (all programs west of Denver to the Utah border) results additionally examined whether a difference existed in scores between Western Slope programs that accept students from families of lower socioeconomic brackets compared to programs that do accept students from families of lower socioeconomic brackets. Of the covariates measured, no variable exhibited significance. Table 15 represents the findings for the Western Slope results.

Table 15

Phase II: Scoring Trends between Western Slope Early Childhood Education Programs

	Coeff	*SE*	*P*
Languages Spoken	-0.217	0.586	0.318
Non CPP	-0.064	0.564	0.908
CCCAP	-0.396	0.218	0.384

Programs that accept infants	-0.129	0.585	0.826
Intercept	2.876	0.570	0.000

Note. *Denotes p<0.050 significance

Greater Denver Regional Results

In the fifth region analyzed, the Greater Denver region (all programs located in suburban towns of Denver) results examined whether a difference existed in scores between programs that accepted students part of the Colorado Child Care Assistance Program versus programs that did not accept students who received assistance through CCCAP. Like the programs located in the Western Slope region of *Colorado Shines*, no variables measured in the fixed effects model for the Greater Denver region produced significant results. Table 16 represents the findings for the fixed effects model of the Greater Denver regional results.

Table 16

Phase II: Scoring Trends between Great Denver Region Early Childhood Education Programs

	Coeff	*SE*	*P*
Languages Spoken	-0.406	0.388	0.301
Non CPP	-1.125	0.649	0.090
CCCAP	-0.373	0.269	0.883
Programs that accept infants	-0.013	0.141	0.924
Intercept	2.928	0.765	0.000

Note. *Denotes p<0.050 significance

Southern Colorado Results

In the last region examined, Southern Colorado results were analyzed to determine whether a difference existed in scores between Southern Colorado programs that accept students from families of lower socioeconomic brackets compared to

programs that do accept students from families of lower socioeconomic brackets. Of the covariates in the fixed effects model, two variables exhibited significance. Early childhood education programs that accept infants, rather than accepting only preschool aged students, scored 2.48 points fewer (p=.003), on average, than traditional preschool programs. Furthermore, programs that were not part of the Colorado Preschool Program scored 2.82 points fewer (p=.049), on average, compared to the programs that identify as Colorado Preschool Program early childhood education schools. Table 17 represents the findings for the fixed effects model of Southern Colorado results.

Table 17

Phase II: Scoring Trends between Southern Colorado Early Childhood Education Programs

	Coeff	*SE*	*p*
Languages Spoken	-1.260	0.659	0.076
Non CPP	-2.821	1.315	0.049*
CCCAP	-0.278	0.304	0.920
Programs that accept infants	-2.487	0.668	0.003*
Intercept	2.402	0.471	0.000

Note. *Denotes p<0.050 significance

Colorado Results

In conclusion of phase II results, all Colorado program results were run together to determine if a difference existed in scores between Colorado programs that accept students from families of lower socioeconomic brackets compared to programs that do accept students from families of lower socioeconomic brackets. Of the covariates in the fixed effects model, every variable exhibited significance. In comparison to programs that do not accept CCCAP, are part of the Colorado Preschool Program, speak only English, and are traditional preschool programs; early childhood education programs that

accept families who need CCCAP assistance scored 0.21 points fewer (*p*=.015), on average, than programs that do not accept families with CCCAP assistance. Additionally, programs that were not part of the Colorado Preschool Program scored 0.36 points fewer (*p*=.000), on average, compared to the programs that identify as Colorado Preschool Program early childhood education schools. Programs that market to students that do not speak English as a primary language scored 0.35 points fewer (*p*=.017), on average, than programs that only speak English. Lastly, programs that accept infants score 0.32 points fewer (*p*=.000), on average, than programs that only accept preschool aged students. Table 18 represents the findings for the fixed effects model of Colorado results.

Table 18

Phase II: Scoring Trends between All Colorado Early Childhood Education Programs

	Coeff	*SE*	*p*
Languages Spoken	-0.349	0.146	0.017*
Non CPP	-0.363	0.084	0.000*
CCCAP	-0.218	0.088	0.015*
Programs that accept infants	-0.321	0.044	0.000*
Intercept	2.742	0.471	0.000

Note. *Denotes p<0.050 significance

Phase 3

The purpose of Phase III was to discover the impact of early childhood teacher education when creating a high quality early education experience.

Qualitative Results

In order to build high-quality programs through effective preschool teachers, participants in this study demonstrated conflicting opinions when characterizing effective preschool teachers. One interviewee stated, “With an effective teacher there is an intent

to everything they try to do…. A plan. Whether it is talking to a child, or planning their lesson plans for a month, everything is intentional in their approach." Another interviewee believed, "The most effective preschool teacher gives their students lots of love. Love, love, love. We need to remember to smile always to them, and I think the learning will become easier when they know they are loved."

There were many similar themes (in the form of policy strengths and weaknesses) that arose from the interviews and observations. Out of the 86 statements of significance that were extracted from the six interviews and two observations, five themes were prevalent. Theme 1 was the most prevalent concept discussed within the interviews, whereas Theme 3 was the least discussed of the themes. Figure 4.1 visually displays the prevalence of the five themes extracted from the interviews and observations.

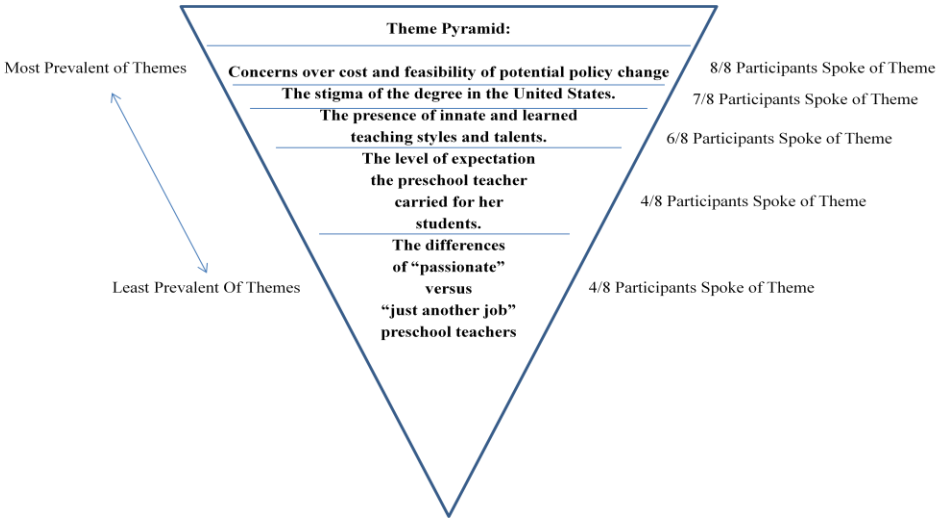

Figure 4.1. Phase III: Pyramid of reoccurring themes.

Theme 1: Concerns over cost and feasibility of potential policy change. The most frequent theme the interviewees discussed included financial cost and feasibility of the potential policy change. To the directors, the financial cost and feasibility were rooted

in the increased cost to hire teachers with bachelor's degrees. However significant the financial strain could potentially be, one director still felt her program could adjust:

> I am really not annoyed with that option [of requiring teachers to earn bachelor's degrees], if the state chooses to do so. Look at what has happened over the past ten years—all those rules that changed requirements for being a lead teacher. We witnessed that and adjusted.

With the teachers, feasibility of the cost of returning to school with the relatively low amount of earnings made in the early childhood education field was pronounced. When one teacher was asked whether the policy was feasible at the teacher level and whether or not she thought teachers would return to school to earn a degree if needed, she stated:

> A bachelor's takes a lot of money, and a master's takes even more. You don't know what their situation is. If they were young, then maybe. But you know, the most seasoned teachers who are in their 30s, 40s, or 50s are the ones who are going to have the most problem getting a degree, and they are the ones that are the most valuable in the classroom.

Another teacher stated similar concerns when she responded, "I think there are really great teachers out there that, maybe for one reason or another, they can't put in for the required time or money it would take." Lastly, the parent concern was expressed in the potential increase in enrollment and tuition costs. One parent argued:

> I wish I could go down the street to the other preschool. But, it's all dependent on time and money. What happens to us single moms who have much smaller incomes and can't afford the more expensive programs? What happens to our kids?

Through these quotes and statements, the directors of both programs felt the policy change would be more feasible to accomplish compared to the teachers and parents. The directors felt that they would still have a pool of teachers to hire from if all preschool teachers were required to earn bachelor's degrees. It appeared the individuals who would experience the greatest strain would be the teachers and parents. The teacher strain would

be prevalent in the disparity between the cost to attend school and salaries received in the profession. The parental strain would be pronounced in the increased tuition fees resulting from directors having to pay higher salaries for degree-earning teachers.

Theme 2: The presence of innate and learned teaching styles and talents.

While most believed that great teachers are born, the directors especially spoke of the increased professionalism and ability to adjust to classroom changes in the teachers who earned bachelor's degrees. One director, in particular, felt that teachers who did not earn bachelor's degrees took an average of five years to "catch up" to the teachers who did earn bachelor's degrees. She stated:

> I used to think the natural ability of the teacher surpassed the degree. But, as I've worked with so many teachers, I believe that the teachers with the bachelor's degrees have just a better overall understanding of early childhood practices. The degree still doesn't surpass the natural ability, but I've seen good teachers with associates degrees become great teachers with their bachelor's degree. The light bulbs came on, just "aha" moments for them.

Both directors believed that teachers who earned bachelor's degrees appeared to take a greater invested interest in continuing education to be stronger teachers; however, this belief was not shared by the teachers. It appeared that teachers of both degree and non-degree categories felt they took pride in their work. The two teachers who did not have bachelor's degrees felt that the state-required certification coursework they took aided them in strengthening their techniques. One of the non-degree teachers went as far to say: "I've had teachers that have had their master's, and they didn't work with the children. They did paperwork. They put it down in writing, but never worked with the kids." She believed that teachers with degrees knew how to work the system better, specifically

recording daily events and lesson plans that looked good on paper, but were actually weaker teachers when it came to student-teacher interactions.

In the two observations conducted in the preschool classrooms, there was a clear distinction between the teachers relying on their innate skills versus learned teaching styles. In the classroom of the teacher with the bachelor's degree, the class was more rigorously conducted with clear expectations that the students would become proficient at writing the letter *S*. The teacher followed a designed curriculum specifically targeted to preparing students for kindergarten. As she taught her lesson from start to finish, she utilized phrases and transition processes taught in teacher education classes. The teacher without the bachelor's degree was still a productive teacher; however, she gave her students greater leeway in the lesson's activities. The class was run in a disjointed manner that clearly worked for the teacher. She traveled the classroom wishing the students would follow her, but not enforcing participation. Her goal was to teach anatomical parts of the human skull but lacked clear instruction on what the parts did to protect the brain.

Theme 3: The differences of "passionate" versus "just another job" preschool teachers who work in the profession. Multiple participants spoke of the "passionate" versus "just another job" preschool teacher. The participants recognized the classification of teachers who were passionate about teaching at the preschool level and their love of children versus the classification of teachers who worked in programs for the lack of a better job. If a policy change were to take place, most felt the teachers who considered teaching their mission would adjust, and those who did not carry that passion would leave the profession to find another job. One director felt the journey to receiving a

degree proved dedication and intent to the profession. She stated, “In my opinion, having a degree just speaks volumes about their investment in their profession, that they are willing to go that extra mile to gain more understanding.” Both directors felt they were able to observe a higher level of professionalism and planning in teachers who earned degrees. A teacher who earned a bachelor’s degree agreed by adding: “In the settings I’ve been in, the ones that have the bachelor’s degree seem to take more pride in what they do. And, it’s a passion, not a job. I guess it is a mindset between passion versus job.” However, both recognized teachers without degrees could still be effective preschool teachers.

This theme was also present in the observations. Whereas the degree teacher excelled in a planned lesson, she did not show nearly as much passion as the teacher without the degree. The degree teacher never commended or provided any positive reinforcement to her students when they achieved a correct answer. She also carried a distinct attitude that there was a thick line between her and her students. In fact, many times she acted very cold to the progress of the students. The teacher without the degree was the exact opposite. Before the academics of the class, she cared more for the wellbeing of the students. She praised them on their participation, even if they made mistakes in the guided activity. She made sure to walk the classroom and have contact with every student during the lesson.

Theme 4: The level of expectation the preschool teacher carried for her students. The debate of whether preschools should be more nurturing or academic was at the forefront of this theme. Both teachers and directors felt parents were driving this debate, and this drive was evident in the opinions of the parents who were interviewed.

One parent thought preschool was a precursor to preparing students socially for kindergarten by saying, “My expectations would be to teach my child how to be a role model to other students, how to be a kind person, and how to understand limits.” The other parent was very clear she wished her son would be able to write, read, and perform basic mathematics skills by the time he entered kindergarten. The parent stated:

> My son’s teacher thinks: “Reading, mathematics? They get that in kindergarten. As long as they can count to twenty, I’ve done my job.” When you have teachers that don’t understand what happens in kindergarten—that is the bigger issue for me. They need to understand the expectations of kindergarten. If they don’t, the preschool fails.

As strong, and varying, as the parent opinions were on this theme, the teacher under discussion had a level of expectation for her students that was even more pronounced in the observations.

In the observations, the teacher with the degree had clear objectives and goals for her students and was very organized in her lesson. In speaking to her in a separate interview, she clearly knew the expectations of kindergarten students and stated by the time her students entered kindergarten they would know by recognition and be able to write numbers and letters. The teacher without the degree focused more on behavior and interaction skills. In her interview, she stated the most important mission of a preschool teacher was to provide the students with love and acceptance. She did teach concepts imperative to skills in kindergarten, but they took a secondary role.

Theme 5: The repute of the degree in the United States. A fifth theme found in the interviews encompassed the general reputation of the degree. All participants referenced at some point in the interviews that they recognized the reputation degrees carry in the United States. The directors stated the strengths of being able to report that a

significant number of their employees held bachelor's degrees for promotional purposes. The teachers reported the perceived notion that bachelor's degree teachers were preferred by parents, and parents recognized the importance of degrees. A teacher with a bachelor's degree stated:

> I probably would say that there is a stigma with people who are educated and those that aren't. As I am in the profession, I know that a degree is a piece of paper and it gives you a certain amount of knowledge. But, it doesn't give you everything you need.

All interviewees believed any type of advanced education would help the profession. In terms of directors, they believed the profession would adjust to the demands of teachers needing to earn a degree. It seemed that teachers felt continuing education, in forms of degrees or trainings, was beneficial. A teacher without a degree stated:

> The classes to become a teacher have really helped me, Curriculum 101 and 102. They helped me because I have a really hard time to planning the plans. And meeting once a month for our classes have really helped me. And, also sharing with other teachers and everyone is sharing their ideas have really helped me be a better teacher.

All teachers and directors who spoke of the benefits of teachers earning degrees believed there needed to be some relationship with colleges or financial assistance from the government to aid in the completion of programs. Interestingly, both parents preferred experience over degrees. The parents believed with experience comes the ability to connect with children under all life circumstances.

Phase III Descriptive Statistics

The mean raw literacy score of the students was 49.73 points (SD=17.54), and the mean raw mathematics score of the students was 32.87 (SD=9.99) points. The total possible score for literacy portion of the assessment was 75 points, and the total possible score for the mathematics portion of the assessment was 45 points. Of the teachers

sampled (*N*=107), 43% (*SD*=0.49) earned a bachelor's degree and taught an average class size of 15 students (*SD*=2.19). The sample student participation in the study collected at the classroom level was 53% male and 47% female (*SD*=0.13). Twelve percent (*SD*=0.09) of the students had an Individualized Education Program (IEP), and 21% (*SD*=0.16) were enrolled as English as a Second Language (ESL) students. Additionally, 41% of the students whose scores were reported in the study were Caucasian, 16% were African American, 8% classified as Multi-race, 8% were Asian, and 27% were reported as unknown race. Of the total classroom sample, 47% (*SD*=0.18) of the students identified as Hispanic. Teacher degree status, classroom size, sex, IEP status, ESL status, and race/ethnicity were all used as Level 2 variables. The descriptive statistics of the participants are displayed in Table 19.

Table 19

Phase III: Preschool Programs and Covariates

Variables	*N*	Mean	*SD*
Level 1 variables			
Literacy score mean (raw)	1587	49.73	17.54
Mathematics score mean (raw)	1587	32.87	9.99
Level 2 variables			
Lead teacher has earned bachelor's degree	107	0.43	0.49
Classroom size	107	14.86	2.19
Sex	107	0.53	0.13
Classroom IEP status	107	0.12	0.09
Classroom ESL status	107	0.21	0.16
Classroom race/ethnicity			
Caucasian	107	0.41	0.16
African American	107	0.16	0.10
Asian	107	0.08	0.08
Hispanic	107	0.47	0.18
Multi-race	107	0.08	0.06
Unknown	107	0.27	0.16
Valid *N* (listwise)	1694		

Quantitative Results

For the quantitative results, the findings for the models that examined whether having a bachelor's degree could significantly predict student school readiness success on the *TS Gold* assessment after controlling for sex, classroom size, race, IEP status, and ESL status are presented. In the mathematics Model 2, only one variable proved significant—ESL status ($p<0.001$). For ESL status, the result was negative. Students who classify as ESL scored an average of 1.81 standard deviations lower on mathematics scores compared to students who do not classify as ESL students. For answering the question of whether a teacher having a bachelor's degree can predict overall school readiness success on the *TS Gold* assessment, the relation was not significant. A bachelor's degree had no effect on overall student mathematics scores. There was also a lack of significant difference in student mathematics scores when examining race, IEP status, and sex between the two groups of teachers. In conclusion, students who were taught by teachers who have earned a bachelor's degree did not score higher on the mathematics portion of the school readiness assessments. Because student demographics were not available for the Level 1, the variance between the empty level model and the student level model was unable to be found. At Level 2, 1% of the variance was explained when additionally examining classroom demographics. Table 20 represents the findings for the mathematical portion of the assessment.

Table 20

Phase III: HLM Results for Teacher Degree and Mathematics School Readiness Assessment Performance

	Empty	Model 1	Model 2
Fixed effects	Coeff. (*se*)	Coeff.(*se*)	Coeff. (*se*)
Constant	0.07(0.09)	0.07(0.09)	11.59(19.74)
Bachelor degree			-0.15(0.19)
Sex			-0.10(0.74)
Individualized education program (IEP) status			-0.38(0.98)
English as a second language (ESL) status			-1.81(0.72)*
Race/ethnicity			
Asian			0.26(1.07)
African American			-0.33(0.91)
Hispanic			1.22(0.70)
Multi-race			-1.07(0.98)
Unknown-race			0.04(0.84)
Class size			-2.56(4.36)
Random effects			
u_{00}	0.00	0.00	0.91
σ^2	0.85	0.85	0.84
χ^2	106.31*	106.31*	95.00*
ICC	1	1	0.48
PVAF Level 1		N/A	
PVAF Level 2			0.01

Note. *Denotes $p<0.05$ significance

In the literacy Model 2, only two variables proved significant—ESL status ($p<0.001$) and Hispanic origin ($p = 0.002$). For ESL status, the result was negative. Students, who classify as ESL students, scored an average of 2.04 standard deviations lower on literacy scores than non ESL students. For Hispanic classification, students that classify as Hispanic scored an average of 2.03 standard deviations lower on literacy scores than students who do not classify as Hispanic students. In answer to the question of whether a teacher having a bachelor's degree can predict overall school readiness literacy success on the *TS Gold* assessment, the relation was not significant. A bachelor's

degree had no effect on overall student literacy scores. There was also a lack of significant difference in student scores when examining race, IEP status, and sex between the two groups of teachers. In conclusion, students who were taught by teachers who had earned a bachelor's degree had no added effect to score higher on the school readiness assessments. At Level 2, 19% of the variance was explained upon additional examination of classroom demographics. Table 21 represents the findings for the literacy portion of the assessment.

Table 21

Phase III: HLM Results for Teacher Degree and Literacy School Readiness Assessment Performance

	Empty	Model 1	Model 2
	Coeff. (*se*)	Coeff.(*se*)	Coeff. (*se*)
Fixed effects			
Constant	-0.04(0.09)	-0.04(0.09)	23.23(20.08)
Bachelor degree			0.10(0.19)
Sex			-0.80(0.75)
Individualized education program (IEP) status			-0.45(1.11)
English as a second language (ESL) status			-2.04(0.48)*
Race/ethnicity			
Asian			0.35(0.91)
African American			-0.03(0.97)
Hispanic			-2.03(0.53)*
Multi-race			-1.62(0.83)
Unknown-race			0.24(0.66)
Class size			5.03(4.43)
Random Effects			
u_{00}	0.00	0,00	0.16
σ^2	0.68	0.68	0.81
χ^2	131.60*	131.60*	95.00*

Random Effects			
ICC	1	1	0.83
PVAF Level 1		N/A	
PVAF Level 2			0.19

Note. *Denotes $p<0.05$ significance

Summary

In summary of the results for phase I, early childhood education positively associated with improved eighth grade state at or above proficiency percentages in the mathematics and writing summative assessment scores, but appeared to have no association with science or literacy scores. When examining reliability and validity scoring procedures for *Colorado Shines* in phase II, early childhood education programs that accepted CCCAP, were not part of CPP, had children that spoke more than one language, and accepted infants scored lower compared to programs that did not accept CCCAP, were part of CCP, only had students that were English speaking students, and did not accept infants (were traditional preschool programs). Phase III results showed that teachers with bachelor's degrees did not significantly improve overall student mathematics and literacy scores under *TS Gold* compared to students of teachers that did not have bachelor's degrees.

CHAPTER V

DISCUSSION

The following discussion begins with a review of the quantitative and qualitative methods used to examine the research questions of all three phases, and encompasses a discussion of the research results to aid in the conversation and development of the importance of investing in high quality early childhood education. Furthermore, the discussion will conclude with the study's contributions to the current climate of early childhood education necessity, the limitations of the study, and suggestions as to where the United States could extend funding and research to ensure all children have the opportunity to attend quality early education programs.

Review of the Dissertation

In response to the landmark study by Esping-Andersen (1999) in which the researcher determined there was an inequality of human and cultural capital between the Organization for Economic Cooperation and Development (OECD) countries, with the United States falling short among these countries, this dissertation strove to examine techniques to first prove how important high quality early childhood education is at the national level, but, more importantly, begin a national discussion to ultimately decide how to define high quality early education standards and implement high quality initiatives, based upon these standards. Multiple states, such as Colorado through *Results Matter* and *Colorado Shines,* have begun to take the necessary steps to incorporate high quality concepts into legislative initiatives and actual practice. A distinct definition and direction into how Colorado defines high quality, and empirically based data to support high quality endeavors, needs to be improved.

Therefore, to assist in this initiative, the dissertation posited the following research questions:

Phase IA: Will access to high quality early childhood education programs have a positive relationship with at, or above, proficiency eighth grade student mathematics, science, writing, and literacy summative assessment scores compared to scores of students that did not attend an early childhood education program?

Phase IIA: Will *Colorado Shines* QRIS reliably and validly rate the overall quality of early childhood education programs who enroll children from families of all socioeconomic levels?

Phase IIIA: Do preschool teachers believe that teachers who earned a bachelor's degree are more effective than those who do not have a bachelor's degree?

Phase IIIB: Do directors of preschool programs believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree?

Phase IIIC: Do parents of preschool children believe that teachers who earned a bachelor's degree are more effective than teachers who do not have a bachelor's degree?

Phase IIID: Is having a preschool teacher with a bachelor's degree a significant predictor for success in mathematics and literacy school readiness as measured by the Colorado Department of Education endorsed *TS Gold* assessment?

To answer the quantitative question of phase I, this phase used an ordinary least squares (OLS) model to examine newly released data (May, 2016) from the Annie E.

Casey Foundation Annual Kids Count Data Center. To answer the research question for phase II, a specific type of Rosenbaum and Rubin's (1983) propensity score matching (PSM) at the program level was utlilized in which programs that accepted students receiving child care assistance funds were set as the experiemental variable compared to programs that did not accept students receiving child care assistance funds. A logistic regression first obtained a propensity score value of programs participating in *Colorado Shines* QRIS. Secondly, a nearest neighbor matching method examined and matched the overall distributions of the early childhood education programs' scores. Lastly, a fixed effects model determined if a difference existed in scores between programs that accept students of lower socioeconomic families versus those that do not. A transformative design was used in which the Joint Committee on Standards for Educational Evaluation Program Evaluation Standards provided an overarching framework for the study (Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007). For Phase III qualitative research questions, a case study approach was utilized, because the study involved research within a real-life, contemporary context (Yin, 2009). For phase III quantitative research questions, Hierarchical Linear Modeling (HLM) was utilized, because the participant, procedure, and results of the study were nested (Maas & Hox, 2005). Weber's Social Action Theory focused Phase III to explain how social perceptions at the micro level of society influence individuals carrying out rational social actions designed to achieve goals of bureaucracies at the macro level of society (Bryant, 2014).

In an overview of the results for phase I, early childhood education positively associated with improved eighth grade state at or above proficiency percentages in the mathematics and writing summative assessment scores, but appeared to have no

association with science or literacy scores. When examining reliability and validity scoring procedures for *Colorado Shines* in phase II, early childhood education programs that accepted CCCAP, were not part of CPP, had children that spoke more than one language, and accepted infants scored lower compared to programs that did not accept CCCAP, were part of CCP, only had students that were English speaking students, and did not accept infants (were traditional preschool programs). Phase III results showed that teachers with bachelor's degrees did not significantly improve overall student mathematics and literacy scores under *TS Gold* compared to students of teachers that did not have bachelor's degrees. For qualitative results of phase III, directors felt that teachers who had earned bachelor's degrees increased the level of professionalism in early education, whereas teachers, themselves, felt they did not need a degree to be a good teacher, nor did they feel the profession financially rewarded the efforts of earning higher education degrees.

Discussion

Phase I supported the multitude of studies supporting the concept that attending early childhood education contributes to adult stability and success. Esping-Andersen et al. (1999) attributed that an inequality in income earnings related to human and cultural capital could trace back to early education access. Nordic countries that increasingly and consistently invested in preschools and child care were able to better reduce income inequality later in life, therefore increasing mobility. In a later study by Esping-Andersen et al. (2012) the researchers determined countries that focused on increasing mobility of children were found in, "centers that do not replicate social class differences" (p. 527). Stated best by Schmit, Matthews, Smith, and Robbins (2013), children that experienced

the highest level of poverty, and greater threat to latter income inequality, benefited the most from high-quality early care and education programs. Therefore, in order for the United States to equalize with other OECD countries in terms of intellectual and human capital, a solid investment in high quality, accessible early education is vital.

The main purpose of Phase II was to develop and execute a study that would examine the Colorado Department of Human Services (DHS) and the Colorado Department of Education (CDE) *Colorado Shines* QRIS. This study was important to conduct since many state leaders believe this rating system will create higher quality early childhood education programs and preschools throughout the state to better serve the needs of all young children. Through adoption of this rating system, many policies could potentially be developed creating financial and feasibly strife in perhaps one of the most important educational levels in the American schooling journey. Through the results of the study, an implicit bias of scoring between programs that accepted Colorado Child Care Assistance Program students and programs that did not accept CCCAP students, programs that are not part of the Colorado Preschool Program versus programs that are in CPP, and programs that accept infants versus those that did not accept infants appeared to exist. Through this indicated bias in the scoring system, programs that serve specific lower status socioeconomic populations are at risk of receiving lower state or national financial assistance compared to programs that potentially need this financial assistance less due to the exclusion of these lower socioeconomic students (HB 14-1317). An example of this risk presented in the examination of aligning CCCAP rates provided to child care centers to the scores the program received through *Colorado Shines* QRIS. Programs that received a quality rating score of one or two will receive less funding per

child through HB 14-1317 compared to programs that receive a three, four, or five. If programs statistically receive less funding per child because the program chooses to serve families of lower socioeconomic status, the program could be at greater risk for closure. If there is a trend of programs who accept CCCAP closing, a potentially greater gap in social or income inequality will arise due to families not sending children to early childhood education programs; because they cannot find programs that accept CCCAP, and cannot afford tuition to schools that do not accept CCCAP. Thus, where will these students attend school?

These findings align with the necessity to review and conduct policy under the guidelines of the Joint Committee on Standards for Educational Evaluation (JCSEE) Program Evaluation Standards (Yarbrough et al., 2011). Before state and local lawmakers implement any level of adoption in relation to state/national funding, conducting a full examination of *Colorado Shines* QRIS by an independent panel of subject matter experts is vital. It is important to recognize that this dissertation does not argue or disagree with the concept of a rating system. As Wolfe (2013) noted, some level of accountability needs to exist. However, a full analysis and evaluation must occur before lawmakers implement any ruling that further exacerbates any level of inequality. As far back as the 1960's, Friedman (1962) argued a society that had long-term differences in income status inequality continued to produce such rigidity that families stayed in the same financial position year after year. In an examination of the research that focused on why long-term differences in income status inequality persist, two common themes emerged. These themes emerged as (1) inequality of cognitive skills, and (2) inequality of human and cultural capital (Esping-Andersen, 1999). The findings of this study greatly support the

need to follow Friedman and Epsing-Andersen's urging to focus on providing opportunity to all students of every level of socioeconomic status, and the need to ensure programs potentially disrupting the path to equality are eliminated.

Supporters of *Colorado Shines* QRIS, HB 14-1317, and SB 10-151 stress that this program is the gold standard to ensure advancement of quality in early childhood education programs. If state leaders correlate CCCAP reimbursement rates to scores, and programs that accept CCCAP are already statistically scored lower than counterparts close, this could significantly detract from improvement of quality in the profession. Overall, scores will only rise, not improve, because lawmakers will indirectly close lower-scoring programs through unfair CCCAP reimbursement rates - the very programs that aid in improving social equity. The finding through this portion of the dissertation violates the proprietary standards of JCSEE's Program Evaluation Standards. As the third JCSEE standard, propriety standards, "support what is proper, fair, legal, right and just in evaluations" (p. 125). Through the findings of the phase, it does not appear that leaders of *Colorado Shines* QRIS are responsive to the needs of the participants, ensuring all evaluations used in the rating of the programs were fair and understandable in addressing the needs of early childhood education programs.

Alternate hypotheses provided by supporters of *Colorado Shines* QRIS argue that children from lower socioeconomic brackets have the opportunity to attend Head Start and Colorado Preschool Programs. Unfortunately, Mckenzie (2013) reported the youngest age accepted at these programs is age three, and as shown through the results, bias scoring of programs accepting infants exists. If programs that accept both infants and CCCAP students close due to scoring biases and programs that are argued as the solution

for social equity only take children ages three and higher, infants, especially coming from lower socioeconomic brackets, are denied the very formal education lawmakers are publicly arguing for to raise the quality of the industry. Returning to the JCSEE Program Evaluation Standards regarding this concept, leaders of *Colorado Shines* QRIS appear to be in disagreement with the utility standards, specifically Utility Standard 8: Concern for Consequence and Influence. Utility Standard 8 states, "Evaluations should promote responsible and adaptive use while guarding against unintended negative consequences and misuse" (Yarbough et al., 2011). The leaders are in potential violation for Utility Standard 8, because extreme misuse of the scoring system in social and income inequality is present through penalization of programs that accept CCCAP students and infants.

The main purpose of phase III was to develop and execute a study that would examine both preschool practitioners' thoughts on teacher education development while embedding a quantitative protocol in attempts to begin providing evidence-based conclusions to define teacher effectiveness. Without an empirical foundation supporting many stakeholders' beliefs that only teachers with bachelor's degrees are able or competent to teach in this new model, many policies could potentially be developed creating financial and feasibly strife in perhaps one of the most important educational levels in the American schooling journey.

The qualitative results of the phase supported the finding that out of the three groupings of individuals interviewed in the study, the directors were the greatest supporters of the preschool teacher education policy change by believing the change would holistically help the profession. Further findings revealed that both teachers and parents felt preschool teachers without bachelor's degrees could still be effective

teachers, but the teachers felt that any type of advancement in teacher practices were beneficial to the individual teacher. These findings align with Weber's Social Action Theory and the belief that institutions consist of individuals carrying out actions that are designed to achieve the goals of bureaucracies (Secher, 1962). By organizations, such as the Colorado Department of Education and Colorado Department of Human Services, Early Childhood Division, influencing stakeholders by portraying that preschool teachers with bachelor's degrees are more effective preschool teachers, the first supporters need to be the directors. As evident in Themes 1 and 5, directors understood the power and repute degrees hold in the United States and by hiring only those with degrees, the goals of the bureaucracies are achieved. These findings support the conclusions from Abecedarian study in which researchers observed that students in classrooms taught by teachers with bachelor's or master's degrees tended to be more creative, engaged, and supported than students who were taught by non-degree teachers (Barnett, 2004).

The Social Action Theory is further supported by the findings of the study that the biggest threat to achieving the goals of any bureaucracy lie in a subsection of the theory called traditional action. Bryant (2014) argued that traditional action hampers the progress of change by people acting or believing a certain way because of built-in habits. This concept was pronounced in Themes 2, 3 and 4. Many teachers and parents believed preschool teachers did not need bachelor's degrees, because the standard tradition was for these teachers not to earn degrees. Throughout the observations, both the degree and non-degree teachers clearly established an order of routines in their respective classroom. Both teachers stated that the majority of their teaching skills were innate or learned from other teachers, and although they appreciated coursework or seminars, they used very

little of those skills during a whole normal day, every day. This finding supported conclusions from the Early et. al (2007) study that teachers will often utilize help and advice from mentors to refine skills in the classroom, and that many teachers find apprenticeship and internship time more valuable than actual classroom instruction. In a selectively designed section of the Abecedarian study, researchers observed that teachers without degrees were just as effective as degree teachers in terms of engagement, support of student development, and lesson plan development when they went through a rigorous apprenticeship and were monitored and counseled throughout their career (Barnett, 2004).

This phase also provided evidence that the repute of the degree, or more closely an examination of why certain teachers had not earned a degree, was a theme of particular interest. From a policy perspective, it is vital to rely on a combination of formal educational requirements and demonstrations of knowledge and skills to assure a minimum quality in new teachers. More importantly, policies that are developed need to ensure that those capabilities are used effective and continue to develop after teachers are hired (Barnett, 2004; Burchinal et al., 2008; Gormley et al., 2004; Mckenzie, 2013).

Additionally, this phase corroborates Mckenzie's argument (2013) that the similarities of the interviewees included the passion and drive to prepare all students for kindergarten. To support this comparison, additional high-ordered strategies were utilized to develop theoretical propositions and negations of rival hypotheses. As stated in the Methods section, cross-case synthesis was used throughout the analysis of individual interviews to examine whether the themes determined were instances of similar or different thought processes of the preschool practitioners. The differences arose in how to

prepare the children for kindergarten, and these differences were prevalent within the accreditation and classification of the four teachers' education levels. In the observations, the one who had earned a bachelor's degree appeared to have developed stronger didactic classroom practices, whereas the one who did not have a degree exhibited stronger student-teacher interactions.

These mixed-methods results were contrary to those of qualitative alone where a lack of significant difference was found in mathematics and literacy scores in the *TS Gold* school readiness assessment. After the participants were interviewed and the notes were transcribed to the discussions, it was sought to determine if there was an advantage for preschool students to be more prepared for kindergarten who were taught by teachers who earned a bachelor's degree over preschool students who were taught by teachers without degrees. As seen in the models run, there was no overall statistical difference supporting the belief teachers with degrees are more effective in teaching mathematics and literacy concepts. Although the phase only captured mathematics and literacy skills through assessment form, a crucial element of the quantitative portion of the study was found in the ESL status covariate result and that teachers with degrees were more effective at teaching a wider range of language-speaking students in the preschool classroom. Due to inclusion methods of many classrooms, more diverse classrooms appear to require teachers who have been taught methods to instruct all student learners.

When reviewing the data, rival or alternative hypotheses were examined to find possible alternative reasons why particular teachers did not earn bachelor's degrees. To test alternative hypotheses, Ahl's (2006) theory of motivation in adult learners was used as a model. In reanalysis of the data, themes connected to a lack of interest or

identification within a social group in which education is not highly valued were searched to determine if these concepts had any effect on teachers who had not earned bachelor's degrees. There were no trends in the data of the teachers interviewed. In fact, the data supported that non-degree teachers would like to go back to school to receive a higher education. The reasons why they did not earn degrees had nothing to do with a lack of time, interest, or because they did not consider education to be important. The reasons were more closely related to lack of financing, scheduling, and a fear of returning to school with a much younger cohort. Education was highly valued among the non-degree teachers. A teacher stated: "One thing I appreciate, being in the education field, you're surrounded more than other professions by people that really do love learning." As great as the desire to return to school for a degree, the teachers still felt they were strong educators and cared greatly for the wellbeing of the students. Return to school, in the minds of the teachers interviewed, would be a bonus, not a necessity.

Limitations

Clear biases and limitations did exist in the dissertation of the study. The primary limitation associated with the first phase of the study would be the lack of student level data from infancy to the eighth grade for ultimate examination. The results that were reported only examined parameters at the state level in percentages. Although still explanatory, tracking certain cohorts of students with individual data would be of upmost importance into determining how far the benefits of early childhood education extend into primary, secondary, and higher education grades.

The primary limitations associated with phase II existed in the sole analysis of Colorado early childhood education programs. A stronger study needs to include rating

scores of programs across the United States if other states hopefully start adopting parameters to measure quality in early childhood education. An additional limitation was present in the reporting of covariates, such as CCCAP and infants accepted. Currently, the *Colorado Shines* QRIS website only reports whether the program accepts infants or CCCAP families, but does not report the exact percentage of infants attending programs or families using CCCAP funding. A stronger study would examine the weights of the covariates when examining if a scoring difference of varying percentages of CCCAP students exists.

Clear biases and limitations did exist in the interviews and observations for phase III. The programs participating in the interviews and observations employed directors who felt very strongly about continual improvement and betterment of their programs. It was evident that the individuals who were willing to participate in the interviews and observations were individuals who carried very strong opinions about the profession. To make the study stronger, more participants are needed to provide more holistic points of view. As for the observations, obviously two teachers (one of each type of experience) does not provide trends or patterns of preschool teachers. Furthermore, however strong the Social Action Theory supports this research, limitations do exist in the theoretical framework. Byrant (2014) stated this theory tended to ignore wider social structure, and to address this limitation, participants who are not preschool practitioners need to be interviewed. Additionally, the study only captured mathematics and literacy skills through assessment form in the quantitative portion of the study. A more conclusive study examining social and developmental domains would further strengthen this study.

Future Research

Future research into *Colorado Shines* QRIS is essential. If the state decides to align CCCAP reimbursement rates to a program's quality rating score, the state must establish a task force to examine scoring patterns, and interview industry professionals to ensure that the rating program is holistically fair and neutral in scoring programs that accept students from all socioeconomic brackets. An additional research project would include running a factor analysis of individual scores in domain categories to determine exactly where, if any, scoring discrepancies exist between early childhood education programs (for example: is there a specific domain – like leadership - in which programs that accept CCCAP students score lower throughout compared to other programs).

Future research into preschool teacher education and accreditation is also essential. If the state decides to require all preschool teachers to earn bachelor's degrees, a task force must be established to observe and interview multiple teachers across the profession to determine efficiency patterns and skills of preschool teachers. Based on the observations in phase III, it would be interesting to observe team teaching between the two teachers observed in this phase. It would be very educational to observe how the teaching strengths of both teachers could be blended to produce an instructionally strong preschool classroom. It appeared that the students in the classroom of the teacher with the bachelor's degree were more ready for kindergarten in regards to academic skills, but the students in the classroom of the teacher without the bachelor's degree were more social and confident. It is vital to observe other teachers with or without degrees to determine if they follow the same trends of these two teachers. In conclusion, this phase supports Barnett's (2004) conclusion that if the country's lawmakers wish to provide federal

policy raising requirements to certify preschool teachers, compensation and tuition assistance must be provided.

Conclusion

This dissertation supports Schmit, Matthews, Smith, and Robbins (2013) conclusion that if the country's lawmakers wish to provide federal policy raising principles to ensure higher quality early childhood education programs, insurance to protect programs supporting students from all socioeconomic levels from closing is of upmost importance. This dissertation examined the complexity of quality-rating assessment programs and teacher education in connection with the early childhood education profession. In conclusion, quantitative findings of the study describe that as *Colorado Shines* QRIS currently functions, clear implicit bias exists in scoring for programs that accept students from lower socioeconomic brackets. As stated, this bias could potentially create an even greater gap in social and income equality of certain disadvantaged groups the United States. This dissertation could be also taken to clarify the debate of whether preschool teachers should be required to earn bachelor's degrees in hopes of having more effective teachers to build high-quality preschool programs, though at higher cost of care. What this dissertation accomplishes is a divide of thoughts amongst preschool practitioners. Previous studies have grouped all practitioners together or failed to examine a particular subset of preschool professionals. This dissertation provides a division of the thoughts among the directors, teachers, and parents of preschool programs. Qualitative conclusions of phase III state that directors supported the research question that preschool teachers with bachelor's degrees are more effective teachers compared to teachers without bachelor's degrees. Parents and teachers, however,

felt there was no difference of effectiveness between teachers who did have degrees versus teachers that did not have degrees. Quantitative conclusions of the study conclude there were no overall significant differences in student skill scores in mathematics and literacy as measured by the *TS Gold* school readiness assessment. Results of this dissertation therefore conclude that more important than the title of the degree, to be classified as an effective preschool teacher, continual advancement and training is ultimately important. Final conclusions of the dissertation support that an independent panel needs to conduct a full examination of high quality definitions in the state of Colorado and the United States to ensure every child has the opportunity to attend and grow in a high quality early childhood education program.

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Appendix A
IRB Approval Letter

Institutional Review Board (IRB) for the Protection of Human Subjects
Date: 3/16/2015
IRB Review
IRB PROTOCOL NO.: 15-149
Protocol Title: Effects of Teacher Education Degrees On Preschool Mathematics and Literacy School Readiness Assessment Scores
Principal Investigator: Rebecca Keith
Faculty Advisor if Applicable: Sylvia Martinez
Application: New Application
Type of Review: Expedited 7
Risk Level: No more than Minimal Risk
Renewal Review Level (If changed from original approval) if Applicable: N/A No Change
This Protocol involves a Vulnerable Population: N/A (No Vulnerable Population)
Expires: 15 March 2016
*****Note, if exempt: If there are no major changes in the research, protocol does not require review on a continuing basis by the IRB. In addition, the protocol may match more than one review category not listed.
Externally funded: ☒ No ☐ Yes
OSP #: Sponsor:
Thank you for submitting your Request for IRB Review. The protocol identified above has been reviewed according to the policies of this institution and the provisions of applicable federal regulations. The review category is noted above, along with the expiration date, if applicable. Once human participant research has been approved, it is the Principal Investigator's (PI) responsibility to report any changes in research activity related to the project:

- The PI must provide the IRB with all protocol and consent form amendments and revisions.
  - The IRB must approve these changes prior to implementation.
- All advertisements recruiting study subjects must also receive prior approval by the IRB.
- The PI must promptly inform the IRB of all unanticipated serious adverse (within 24 hours). All unanticipated adverse events must be reported to the IRB within 1 week (see 45CFR46.103(b)(5). Failure to comply with these federally mandated responsibilities may result in suspension or termination of the project.
- Renew study with the IRB ***prior to expiration***.
- Notify the IRB when the study is complete

If you have any questions, please contact Research Compliance Specialist in the Office of Sponsored Programs at 719- 255-3903 or irb@uccs.edu
Thank you for your concern about human subject protection issues, and good luck with your research.
Sincerely yours,
Michele Okun, PhD
IRB Reviewer

Appendix B
Teacher Questions

1. Please tell me about yourself and your journey to become a preschool teacher.
2. What is your definition of an effective preschool teacher? What were your expectations for becoming an effective preschool teacher before you started?
3. How have your expectations changed once you completed your education/experience and started teaching in your own classroom?
4. What is your current view of teacher education? Do you feel all preschool teachers need to earn bachelor degrees to create a stronger profession? Do you feel degrees or experience produce stronger preschool teachers?
5. What educational experienced best prepare a teacher for the classroom?
6. What differences do you see in teachers with or without degrees?

Director Questions

1. Please tell me about yourself and your journey to become a preschool director.?
2. As a director, what is your definition of an effective preschool teacher? What were your expectations for an effective preschool teacher before you were the director of this school?
3. How have your expectations of quality teaching changed since becoming a director?
4. What are the most positive/negative aspects of being a director?
5. What is your current view of teacher education? Do you feel all preschool teachers need to earn bachelor degrees to create a stronger profession? Do you feel degrees or experience produce stronger preschool teachers?
6. How do you measure your success in your program? How do you define/explain low/high achievement on the part of your teachers?
7. What educational experienced best prepare a teacher for the classroom?
8. What differences do you see in teachers with or without degrees?

Parent Questions

1. Why did you choose to send your child(ren) to this school?
2. What are your expectations of your child's preschool teacher?
3. How, if any, have your expectations of your child's preschool teacher changed since your child has been enrolled in this school?
4. Do you think preschool teachers need to have a bachelor's degree to better teach your child? Do you feel teachers with bachelors degrees are more preferred by parents than teachers who do not have bachelor degrees as a whole?
5. If you had a choice, would you prefer a teacher who had a bachelor's degree, but was just starting out as a teacher, or a teacher who did not have a bachelor's degree but had at least ten years of experience in a classroom?

Appendix C
Observation Fieldnotes:

Observation #1 / March 24, 2015
10:00 am
Classroom of Teacher with Bachelor's Degree

Millie's classroom is located in the back building of the preschool she has worked at for the past 16 years. When I walked into the classroom on the day of the observation, I was immediately surrounded by 14 wide-eyed children who, without knowing me other than my previous visits to introduce myself, were very excited to hug me and ask me my name again. After giving each child a hug, Millie told me she feels it is important to let them get up from their lesson to greet incomers. She laughed as she stated they would get up regardless of her direction, so she does not even fight the disruption. Once they settled down, she started her lesson. The activity I observed was circle time in which Millie first covered the general characteristics of the day, taught the letter of the day, and then read a book connected to the theme and lesson.

As she prepared the class for the lesson, there were some characteristics of the room I immediately observed. The mat they sat on was a colorful rubber mat that followed a repeating pattern of red, blue, yellow, and green boxes. Despite having fourteen students in the class, the mat was immaculately clean with evidence Millie took extreme care to keep it in optimal condition. I chuckled to myself as I observed each child was sitting in a square reserved for their own personal space. I additionally noticed a warm cinnamon scent that encapsulated the room in a gentle manner. It was the perfect concentration of a cleansing aroma without being too overbearing. Every student section of the classroom - the reading nook, play kitchen area, science table, and art corner - was in perfect order. Similar to the mat, the student materials and toys were kept in orderly

fashion despite being located in a preschool classroom. Millie's teacher area displayed a different order. The tops of the bookshelf and her desk were in extreme disorder. She had stacks of books, workbooks, and cookbooks in uneven piles. In the pile of all the books, she had Common Core materials to help the students prepare for kindergarten. These too were in disorganized piles, but it was evident she used them often. She stated her personal disorder was actually more indicative of her character then her classroom. Keeping things clean, she stated, was her weakness; however, she worked very hard against her natural inclination to keep the student areas in order.

Millie started circle time with a song about the days and at the conclusion of the song the students shouted out the current day, "Tuesday". I chuckled to myself as many of the students continued to glance towards my direction to ensure I was paying attention to their contributions of the song. At this point, I moved my chair behind the students to decrease my disruption to the class. The move worked because after a few glances back to where I was sitting, the majority of the students stopped watching me. After the days of the week song, Millie moved to the exact date of the day. Seemingly to make sure every student had equal and fair chances to clip the rainbow date cards to the calendar; Millie had a running list of when it was each student's turn. Today, a small boy who could have been Jamie Foxx's child walked to the calendar and picked the top card to clip on the calendar. Grinning from ear to ear, he placed the card in the correct spot and swiftly went back to his spot on the mat. Millie continued with the lesson without acknowledging the correct decision of the boy.

The next activity after the calendar was the weather pie chart. Millie called on another student to go look out the closest window to examine the current weather. This

time, a young girl with bright red, curly hair stood up to look out the window. She provided an exact description of every cloud in the sky and stated that it looked very, very hot, but since she remembered walking back to the classroom, she said it was not as warm as it looked. After looking outside, she hopped like a rabbit (arms folded in cuffed position on her chest) to the pie chart and moved the arrow to "sunny, but cloudy." Again, after the young girl sat down, Millie failed to acknowledge the participation of the student.

The letter of the day was, "S." Millie had an array of activities that would emphasize the concept of the letter S. Before she would provide instructions for any activity, the class would first practice making the letter S and then read a story starting with the letter. Millie rose from her teacher's chair and walked over to the white board. Not only having an incredible reputation as a preschool teacher, Millie proved herself to be an accomplished sketcher. She drew snakes, snails, suns, stars, and even different quick sketch sceneries. After she thought of things to draw, she asked the students what they knew started with an S. One student shouted out a sneaker. Another thought of a sidewalk. They continued to provide many examples of words starting with the letter.

Millie then showed the class how to write the letter S. She started with the upper case letter, and then moved to the lower case letter. Millie taped a composite elementary-rule lined row using black tape to signify the boundaries on the white board for continued practice. She demonstrated the process of drawing the letter and then made dotted outlines of the letter for students to come up to the board and practice. The students were making great progress with the letter. The majority of the students – when I counted at this point of the lesson there were 12 of 14 students - were actively engaged in the lesson.

For the majority of the time, the students were extremely well behaved. The other two, one boy and a girl were having some conversation between themselves. I could not help but continue to notice Millie was very absent in praise of positive compliments to her students during this and other activities.

After the students practiced on the board, Millie quieted them down and explained they would have composition paper at the individual spots on the table to practice the letter S after the story. She then asked if the students were ready to read a story. She explained to her class that she planned a very special reading for book time. At that moment, Millie pulled the coveted book from the bookshelf and showed it to the class. Apparently, the book had special meaning to the class because the students cheered in unison when the front cover was exposed. The book was part of the Skippyjon Jones series and this particular book was when Skippyjon Jones went into space. Millie asked a student in class if she could describe the main character to the rest of the class. The young girl provided a rambling account of the character and why this book was one of her favorites. Through her meandering story, I picked up the fact Skippyjon Jones was a Siamese cat who had such big ears he thought he was a Chihuahua and went on these outlandish journeys. At the end of every story, his mom reminded him he was a cat and to be happy with whom he was.

As soon as the class settled down, Millie started the story. Millie started reading in her normal voice; however, when she reached dialogue she read in an accent similar to the Taco Bell Chihuahua voice. The kids just ate her accent up and throughout the story, they sat in complete enrapture. They laughed on cue and followed the story with complete delight. The level of involvement the students carried in this reading was truly

inspiring and I found myself wondering when was the last time I was showed this much excitement and involvement in reading a book. After Millie finished the story, she provided instruction to the students to find their spots and then started individual practice on the letter S. This was when morning activities and my observation ended.

END OF OBSERVATION

Observation #2 / March 27, 2015
10:00 am
Classroom of Teacher without Bachelor's Degree

Anna's classroom is much like her disposition – sunny and cheerful. The theme of the room is colors, patterns, and patterns of colors. Even the carpet followed the theme by repeating patterns of the color spectrum. This was one of the brightest classrooms I had ever seen for there was one total wall of windows and three huge skylights. The room was sectioned into different units of activity, each carrying themes, and art work papered the walls. The unit of learning the students were working on had to have been anatomy because there were skeletons, body outlines of muscles, and sensory posters all over the room. I immediately noticed the smell of the classroom. The classroom was located next to the kitchen and the cook was making egg-salad sandwiches for lunch. Since I visited the school for the interviews, I knew the smell was temporary and the classroom usually had a warm cinnamon scent.

When I walked into the room, Anna was sitting in front of the students in an oversized red chair that looked like a Blu's Clues chair. Her students were sitting in uneven clusters on the mat intently singing songs. She acknowledged I was there by a quick wave, but showed no additional acknowledgement in what I perceived as an attempt to not disrupt the students. For the interviews, I knew she was from Poland and in

spite of her thick accent her students appeared to understand her and were well adjusted. She informed the class they would sing one more song before the activity and then she would dismiss the students to the tables. The song they sang was the bone song. In order to actively pursue the song, the students stood up and spread out their arms to claim their personal space. Once settled, Anna began the song and the students joined in. The class sang from the ankle all the way to up to the head bone, and once they were finished they screamed in unison if they could sing it again, in which she willingly obliged.

After the song was finished the second time, on cue, the students sat back down and waited to be called to the table. The tables were immediately adjacent to the area of where the students were sitting. One by one, Anna called the students to find their respective spot and then wait for further instruction. In this class, there were 14 students and the vast majority of them were boys who seemed extremely active. Despite the boys' activity level, they still listened to Miss Anna and her instructions. The thing I noticed the most about Anna's teaching style was she allowed the class to be loud and she let them squirm in their seats, but once the class needed to listen they gave their full attention. Once every student was sitting in their assigned seat, Anna provided the instructions of the lesson. The students received cutouts of the human skull sections, and a paper plate that had the outlines pre-drawn of the face of the skull. Anna stated they could color the parts of the skull any color they wished, but then they had to put the skull together on the paper plate and glue the pieces down.

The students got to work right away – well almost. There was one boy who really did not want to do anything but run around. Anna had quite a hard time settling him down. She calmly explained she needed to help the other children and could not chase

him. But, if he was willing to sit down, she would help him start on the coloring. This worked for a while, but then he grew agitated again. He ran over to the Lincoln Logs and he stayed there for the remainder of the lesson. She explained to me he was often disruptive during activity time and as long as stayed by the Lincoln Logs and was quiet, she would usually leave him there.

Anna made sure she worked with every single student. She went around the tables and spoke words of affirmation to every student who was working. She stated she loved the colors they picked, and how smart they were to glue the pieces in the right spot. I noticed she always placed her hand on the student's shoulder when she was providing praise. This activity took about fifteen minutes, and when they were done, she asked the class if they wanted to hang up the skulls on the board reserved for the activity. They surrounded Anna as she stapled the paper plates to the board, and once they were finished, she instructed them to the tables to clean up the mess created by the activity. Almost on auto play, the students knew exactly what was expected of them when the activity finished. They put their crayons in their individual cartoons and scissors and glue in the buckets. The instructions further supplied to the students were to sit back on the mat for another activity; however some students did have some difficulties sitting back down. The little boy who left the skull activity to play with the Lincoln Logs rejoined in the transfer chaos to run around with the boys who did not immediately sit down. Anna made a big sweeping motion to the boys and reminded them of the instructions to sit down. The little boy once again skirted around Anna and resumed play at the logs. Anna left the boy there and returned to her seat on the big red chair.

Further continuing with the theme of the anatomy, Anna pulled a *Magic School Bus* book to read to the class. The students seemed excited to read the book and when settled down, Anna put a cassette tape in a stereo located next to the chair and pressed play. The book was part of a series in which celebrities read children books and the mediator (in this case Anna) flipped the pages. Anna needed to remind the students to quietly sit and pay attention to the book; however, she was never harsh. Her voice consistently remained soft and loving with expectations that the students would respond. Soon, the class was engrossed in the book. I noticed Anna kept an eye on the boy with the Lincoln Logs. Like clockwork, he stopped playing with the logs and started paying attention to the story. With each page, he scooted closer to the group and mid-story he rejoined the rest of his classmates. Technically, the thirty minutes of observation ended during the story, but I stayed to see the next activity. Anna informed the class after the story it was time to go outside. Mass chaos promptly followed and Anna had to calm the students back down. Never upset over the noise, Anna reminded the class they would be able to go outside faster the sooner they calmed down. This was when I thanked her and left the classroom.

END OF OBSERVATION