The Early Learning Harvest:
The Relationship between Teacher Educational Levels and Child Outcomes

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Abstract

Early childhood education has proven to be a significant return on investment for society. Research studies have reported greater academic achievement levels, increased probability to graduate, hold a job, and earn higher wages, and be less likely to be involved in the criminal justice system. These results are predicated on one important factor: the early childhood program must be high quality. Unfortunately, there are no clear criteria to identify the measures of high quality. While there are a number of areas that may be considered indicators of high quality early childhood education, i.e., curriculum, class size, and teacher-parent relationships, the one area that has garnered significant attention, through research, is the teacher. The teacher is, perhaps, the most important factor in the success of students. But what characteristics of the early childhood teacher impact student achievement? The purpose of this study was to investigate training differences in early childhood teachers.

The study sample was comprised of students in a 3- and 4-year-old federally and state funded program in Mercer County in Pennsylvania. The data were gathered over two school years and represented 55 classrooms in the county, 33 unique teachers, and 749 students in the assessment averages in order to answer the following question: To what degree do teacher variables of college degree, certification, years of experience in the county early childhood programs, higher education institution issuance of degrees, or state issuance of certification affect child outcomes? A correlational analysis was conducted in order to assess the association between the teacher variables and child outcomes.

Based on the findings of this study there is a relationship between the teacher's degree, certification, and years of experience in the county early childhood program, with years

of experience revealing the greatest impact. This information can inform hiring practices, certification programs, and policy-makers.

Acknowledgments

The word “harvest” can be defined as a result, consequence, effect, yield, or outcome. A “harvest” is preceded by an intentional effort or activity. *The Early Childhood Harvest* research is in essence a “harvest” that was preceded by years of intentional effort and activity. It began in the initial years of my doctoral studies with the “planting” of an idea or a seed of interest in early childhood education. Just like a seed, that interest was sown in the rich soil of passion for children and nurtured with the water, food and light of research, as well as curiosity and dedication, into a completed dissertation study. This study has the potential to influence the harvesting of high quality teachers that nurture high achieving children that will thrive in our world. To each person that had a part in “cultivating” this harvest, I am grateful.

The professors in the Educational Leadership Department at Youngstown State University provided the rich soil that allowed the early childhood idea to germinate and begin to grow roots. Each one challenged my thinking and perspectives and forced me to anchor those roots throughout the process.

My dissertation committee that included my doctoral advisor, Dr. Charles Vergon, Dr. Gail Saunders-Smith, and Dr. Sharon Stringer assisted in adding nutrients to my work through their thorough analysis, suggestions, and advice for its improvement. My research is far richer because of them.

My dissertation chair, Dr. Karen Larwin, was also instrumental in adding nutrients, in addition to a tremendous amount of “water” that helped to nurture my research. Furthermore, she provided a lot of prodding and pruning that helped to cultivate it into the harvest of a mature crop ready to be harvested.

There were also people in my life that provided the light and warmth that wouldn't allow this work to shrivel and die but to grow and flourish. My friends, Beth Work and Nada Abdul-Malak, were my unwavering prayer warriors. My family, especially my sister Becky, brother Doug, and mother-in-law provided constant encouragement, support and prayers. My sons Ryan and Sean kept me grounded and focused on what was most important in life, especially when I got discouraged or a little crazed. My husband Dan was my never-ending champion and inspiration. He gave me the space, patience, and love that I needed, in addition to sacrificing much time together so that I could see this project to fruition. My Mom and Dad never stopped believing in me or praying for me; they were my ultimate cheerleaders, and to them I will be forever grateful. My only regret is that my Mom didn't get to see the crop harvested, and to her memory I dedicate this work. Finally, this project never would have reached "harvest" without the grace, wisdom and perseverance given to me by my Lord and Savior, Jesus Christ. It is only through Him that this "harvest" was produced, and to Him be the glory!

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Chapter 1

Statement of the Problem

In a report issued by the National Institute for Early Education Research (NIEER), Espinosa (2002) stated

> Research has consistently shown that 3- and 4-year-olds who attend a high-quality preschool are more successful in kindergarten and beyond—both academically and socially. But the majority of preschool programs in the United States are not judged as good, with many rated far below that. (p. 2)

Unfortunately, there is little agreement among early childhood experts regarding the definition of a high quality, early childhood program. NIEER proposes that early childhood programs rate quality according to two categories: process and structure. Process is often related to the experiences that children have in the classroom and relationships that teachers have with parents. Processes are much more difficult and expensive to rate if evaluative scales are implemented with fidelity. Structure is easier for policy-makers to affect and understand (Kreader, Ferguson, &Lawrence, 2005). It includes class size, student-teacher ratio, teacher compensation and training (Espinosa, 2002). The training is specific to the level and certification of early childhood teachers. The purpose of this proposed research is to investigate the impact that one area associated with high quality, early childhood education, the teacher's training, has on his or her students' learning outcomes.

Purpose Statement

Early childhood education has become a significant focus of business communities, as a way to boost the economy. Three landmark studies of students who either participated in early childhood programs, or were part of a control group, indicated significant evidence that those who participated in early childhood programs were better off financially at age 40 than those who did not participate (Kostelnik & Grady, 2009; Shonkoff, 2000; Ramey, Pungello, Sparling, & Miller-Johnson, 2002). These benefits were evidenced by higher rates of home ownership, earned income, employment, savings, and, lower rates of welfare (Kostelnik & Grady, 2009). Early childhood education surfaced as a sound investment and policy makers began to take notice; however, there was an important caveat to these benefits: the early childhood programs must be high quality.

Kostelnick and Grady (2009), as cited in Heckman and Masterov (2007), stated "The effects of high-quality preschool for disadvantaged children have been studied extensively. The programs improve student outcomes, increasing their educational attainment, decreasing their criminal activity, and improving their employment and earnings as adults" (p. 14). In 2004, 80 scholars, experts, and activists gathered at a conference in Cambridge, Massachusetts to discuss the effect of quality early childhood education on the economy and to develop recommendations for policy-makers in advancing such programs, if deemed important (Calman & Tarr-Whelan, 2004). Their conclusion was "quality early education benefits children of all social and economic groups" (p. 2). Economic benefits of these quality programs include reducing costs of remediation and special education, producing higher paying jobs for future workers, who,

in turn, pay higher taxes, and lowering crime and prison costs (Calman & Tarr-Whelan, 2004).

Unfortunately, little agreement exists among early childhood experts as to what those characteristics should be. In the Obama Administration's report, *Our Future, Our Teachers* (2011), the Chiefs for Change were quoted as saying, "Research has shown that teachers are the most important school-based factor in determining student achievement" (p. 3). Linda Darling-Hammond (2009) concurred, "Every aspect of school reform -- the creation of more challenging curriculum, the use of ambitious assessments, the implementation of decentralized management, the invention of new model schools and programs -- depends on highly-skilled teachers" (p.1). While specific requirements are defined for elementary, middle, and high school teacher preparation and certification programs within states, agreement is lacking as to the knowledge and skills needed to teach in a quality early childhood program.

Analyzing early childhood certification programs in the same way as other teachers' certification programs presents an additional problem. Because early childhood education is not mandated, nor is identified by No Child Left Behind (NCLB, 2001), significant variations abound between and within states regarding teacher training requirements (National Education Association [NEA], 2010); and, many consider early childhood as a younger extension of elementary training. Unfortunately, the lack of mandates does not mitigate the impact an early childhood teacher has on his or her students' learning. In recognition of this concern, the NIEER specifically recommends that teachers have a bachelor's degree with specialized training or a certificate in early childhood education (Mashburn et al., 2008).

Tremendous variations exist between states and within state programs regarding qualifications of early childhood teachers. Some demand a bachelor of arts degree, while others may simply require the completion of a few courses in early childhood development (Whitebook & Ryan, 2011). As the result of the 2008 Leadership Symposium sponsored by the National Center for Research on Early Childhood Education, Howes et al. (2008) supported this lack of consistency when they reported, "ECE teachers may have either formal education *or* training to be considered effective teachers in some systems, education is as likely to be in-service as pre-service… (p. 3)."

Pianta (2006) suggested that teacher certification has little to do with child outcomes. Outcomes are best measured through some kind of accountability system to ensure that students are learning. Observations of interactions between the teacher and students in the classroom will provide greater support for quality than a certification program. Only when a certification program includes specific training and practice on these interactions, does the certification matter, and, even then, it would be specific to the program that provided such training and practice. This raises the question as to whether the teacher's experience in a specific program impacts child outcomes.

Little research clearly defines what this knowledge, training, and experience of a quality, pre-school teacher should be; there are some experts who propose specific standards. Kostelnik and Grady (2009) provided explicit criteria for this education and training. "Teachers and staff have specific training in child development, early childhood education, and relevant subject matter content such as literacy, mathematics, science, social studies, physical education, and the arts" (p. 23). After a review of research, Whitebook (2003) concluded that "the presence of BA-level teachers with specialized

training in early childhood education leads to better outcomes for young children" (p. 2). In other words, teachers' knowledge and training significantly impact children's achievement.

One of the difficulties in researching the impact of teacher quality stems from the necessity to discern the difference between the teacher's educational background and the other variables in the classroom (i.e., the curriculum, length of the day, and student demographics). Pat Scheffler (2009) noted an unexpected teacher outcome in a study conducted with students in a Pennsylvania, county-wide Head Start program. Her initial investigation was to determine if there was interaction between student demographics (i.e., gender, primary language, and ethnic background). Head Start usage provided her control for curriculum and length of day. The results of the study indicated moderate to strong interaction between the student and age; however, the teacher was the strongest indicator of outcomes. She suggested that further research was necessary to investigate the teacher differences. This research will investigate specific teacher differences, such as the teacher certification, the higher education institute issuing the certification, and the number of years of teaching experience in the Mercer County Head Start program.

Purpose

The purpose of this study is to further investigate differences in early childhood teachers, and, specifically, their training. The study will explore whether there is a relationship between the training and experience of early childhood teachers and student outcomes. This information would provide important information for teacher preparation programs and policy makers.

Significance

Because there is research to support the significant affect that the teacher has on student achievement (U.S. Department of Education [DE], 2011; Linda Darling-Hammond, 2009), exploring specific areas of the training of early childhood teachers will provide insight to institutes of higher education and policy-makers. To what degree do teacher variables of college degree, certification, years of experience in the county early childhood programs, higher education institution issuance of degrees, or state issuance of certification affect child outcomes? This question could be answered by comparing the child outcomes of a state or federal program (i.e., Head Start) to the teacher training data.

Hypothesis

The null hypothesis being examined in this investigation is that no relationship exists between some areas of the teacher's training and child's outcomes. Also, there is not a relationship between the degree, state issuance of degree, or higher education institution issuance of the degree and child outcomes.

Definition of Key Terms

Bachelor's Degree- Post-secondary degree awarded to an individual after completion of 120 undergraduate credits. Bachelor's degrees are most often awarded as either the bachelor of science or bachelor of arts degrees (BusinessDictionary, n.d.).

Child Outcomes- The results measured on the Teaching Strategies GOLD Assessment Tool (Teaching Strategies, Inc., 2010).

CLASS (The Classroom Assessment Scoring System- An observation framework that assists in assessing the quality of key components of the preschool classroom, i.e. emotional and instructional supports (La Paro, Pianta, & Stuhlman, 2004).

DAP (Developmentally Appropriate Practices)- A teaching approach that is based upon research on the ways young children develop and learn as related to effective early childhood education (NAEYC, n.d., n.p.)

DIP (Developmentally Inappropriate Practices)- Practices that do not take into account the child's unique development and instruction that is tailored to his/her needs (Charlesworth, 1998).

ERS (Environmental Rating Scale)- "Observational assessment tools used to evaluate the quality of early childhood programs" (Pennsylvania early learning, 2009, n.p).

High quality- developmentally appropriate early childhood programs produce short- and long-term positive effects on children's cognitive and social development (NAEYC, 2014).

Higher Education Institute- An educational institution that is legally authorized, within a state, to provide a program of education beyond secondary education (20 U.S. Code § 1001).

Inservice- The training that is used to provide information to school professionals about a number of different subjects or issues (Jones, 2008).

advance the quality of teaching and learning" (NBPTS, 2012, n.p.).

Intentional teaching- "Teachers act with specific outcomes or goals in mind for children's development and learning" (Epstein, 2007, p. 1).

Keystone STARS (Standards, Training/Professional Development, Assistance, Resources, and Support)- "An initiative of the Office of Child Development and Early Learning (OCDEL) to improve, support, and recognize the continuous quality improvement efforts of early learning programs in Pennsylvania" (Pennsylvania Early Learning, 2009, n.p).

NAEYC (National Association for the Education of Young Children)- "A professional membership organization that works to promote high quality early learning for all young children, birth through age 8" (NAEYC, n.d., n.p.).

NBPTS (The National Board for Professional Teaching Standards)- Their purpose "is to

NCATE (National Council for the Accreditation of Teacher Education)- A professional organization that provides a process for educational institutions to establish high quality teacher preparation (NCATE, 2010).

NCLB (No Child Left Behind)- The 2002 update to the Elementary and Secondary Education Act that increased the government's role in holding schools accountable for students' learning (Klein, 2015).

NIEER- National Institute for Early Education Research whose mission is to "conducts and communicates research to support high-quality, effective early childhood education for all young children" (NIEER, n.d.).

Outcomes-The results of an activity, plan, process, or program (BusinessDictionary, n.d.).

Pre-service- The culminating experience in a teacher certification program in which the student applies the knowledge and skills that were learned in the college classroom to guided, supervised teaching classroom (Virginia Wesleyan College, n.d.).

Processes- A category for rating the quality of early childhood programs that includes the experiences that children have in the classroom and relationships that teachers have with parents (Kreader, Ferguson, &Lawrence, 2005).

Quality Rating and Improvement Systems- "a systematic approach to assessing, improving, and communicating the level of quality across various early care and education settings" (Mitchell, 2005).

Structural processes- Those practices that are related to the area of structure for rating quality of early childhood programs (Howes et al., 2008).

Structures– A category for rating the quality of early childhood that includes class size, student-teacher ratio, teacher compensation, and training (Espinosa, 2002).

Teacher Certification- A credential that is earned by an authoritative source, such as the government, a higher education source, or a private source (Snowman & McCown, 2012).

Teaching Strategies GOLD- An assessment system that incorporates on-going, authentic assessments for children from birth through kindergarten (Teaching Strategies, Inc., 2010).

Teacher Years of Experience- the number of years that a teacher has taught in a specific county-wide, early childhood program.

Chapter 2

Literature Review

High Quality Early Childhood Education

Early childhood education has garnered attention from both the business and economic communities as a sound return on investment. Significant research supports the fact that students who participated in early childhood programs realized substantial benefits compared to their counterparts that did not (Kostelnik & Grady, 2009; Shonkoff, 2000; Ramey, Pungello, Sparling, & Miller-Johnson, 2002). These benefits were evidenced by higher rates of home ownership, earned income, employment, savings, and, lower rates of welfare (Kostelnik & Grady, 2009). From an economic standpoint, these benefits can increase local, state, and federal revenue generated through taxes, and increases in product sales, and, demands for services. Furthermore, proactivity in developing children's academic skills, regardless of their social status, provides an additional financial benefit. This advantage reduces the amount of funding that must be committed to potential remedial or special education programs as the children enter middle and high school years, resulting from the lack of development of concepts and skills during the early learning years (Shonkoff, 2000).

The Abecdarian Project was an important study as it provided longitudinal data following the students until age 21. Positive benefits included an increase in academic skills, and more years of education, especially higher education (Ramey et al., 2002). The study also reported a greater likelihood that the twenty-one-year-olds held jobs that required greater skills. This resulted in a significant economic benefit (Barnett & Hustedt, 2005). The requirement of greater skills implies an increase in post-high school

education and potentially higher paying jobs indicating greater business and tax revenue. This study went as far as to say that it is not a question of whether or not government should be involved in providing high quality early childhood environments, but how they should do it (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002).

The HighScope Perry Preschool Study was perhaps the most significant study as it followed the majority of its subjects until the age of 40. The study included 123 students who were at a high-risk for failure in school and assigned 58 students to a group that attended a quality preschool, and 65 students that did not attend any preschool. The group that attended preschool evidenced positive outcomes in a variety of areas including: education, economics, family relationships, health and crime prevention (Schweinhart et al., 2005). Benefits at age 40 included:

- Educationally, 77% of program males graduated high school vs 60% of non-program males; 88% of program females graduated high school vs. 46% of no-program females.
- Economically, 76% of program participants were employed vs. 62% of non-program participants.
- Family relationships showed that 57% of program males raised their children vs. 30% of non-program males.
- Health related showed 48% of program males using marijuana or hashish vs. 71% of non-program males; and 0% program males used heroin vs9% program males.
- Crime related lifetime arrests included 36% of the no-program group vs. 55% of the non-program group.

A cost benefit analysis was conducted for students at the age of 27 in the program. It weighed the cost of the preschool program compared to the economic benefits that included higher earnings, reduced incidences of special education services, welfare assistance, and crime. The results produced $7.16 in tax dollars' savings for every dollar spent on the program (Schweinhart, 2002).

In addition to the economic benefits of early childhood education, the need for early childhood education is also supported through research on brain development. Cunha and Heckman (2010) suggested that ability gaps identified in children of lower socio-economic status can be diminished if remediation is put into place early in children's lives. This submission is based on research by Hopkins and Bracht (1975) that suggested that different parts of a human's brain develop different skills at different times and the brain remains flexible enough to modify the learning until that time, i.e. intellectual ability is solidified by age 10 and the part of the brain that can modify emotions is malleable until age 20. This information supports the importance of children learning to the greatest extent possible during their early learning years. Furthermore, Isenberg and Quisenberry (2002) added that neurological connections are made in the brain when young children play. These networks are critical to later learning.

The National Research Council's, *Eager to Learn: Educating Our Preschoolers* (Bowman, Donovan, & Burns, 2001) proposed that there should *not* be a distinction between early childhood education and childcare. The whole child must be purposefully considered in both venues, including the areas of cognition, language, social, emotional, and motor development. While childcare is often considered as simply caring for a

child's basic needs, their proposal suggested that it is far more important than many people have considered, which establishes a link to the education of a child.

Adams, Tout, and Zaslow (2007) supported this claim. Their study, focused specifically on low-income families, found definite linkages between the quality of care and the children's behavior and development. Some findings even supported the ability to predict a child's future development based on the quality of the early childhood care. Interestingly, the one area they pointed out that was not affected by income was a child's behavior. The more hours a child spent in child care, regardless of parental income, tended to increase incidences of less optimal behavior. They may have been more engaged in social behaviors, but they also had more conflict with peers. Additionally, Adams et al. found that quality childcare programs assisted in academics going into kindergarten, but there was not long term support that the growth continued through elementary school. The parent and family connection remained important. This belief is exemplified in the success of a program originating in Chicago.

Similar to the goals of Head Start, the Chicago Child-Parent Centers, a pre-school program (Reynolds, Temple, Robertson, & Mann, 2002), was a federally funded Title I program that provided comprehensive educational, family and health services to Chicago children between the ages of three and nine. Showing significant evidence of positive results, the study comprised twenty-one-year-old adults who had participated in the Child-Parent Center program as early learners and compared them to children who had attended alternative early childhood programs. The outcomes included the following cost reductions: need for remedial services for retention or special education, involvement in juvenile or adult involvement in criminal justice system, child welfare involvement for

child abuse and neglect, and prevention of repayment to crime victims. Additionally, a growth in tax revenues due to an increase in adult earnings attributed to employment was seen.

Many studies focus specifically on the benefits for students who are in lower socio-economic demographics. Kostelnick and Grady (2009), as cited in Heckman and Masterov (2007), stated, "The effects of high-quality preschool for disadvantaged children have been studied extensively. The programs improve student outcomes, increasing their educational attainment, decreasing their criminal activity, and improving their employment and earnings as adults" (p. 14). Britto, Yoshikawa, and Boller (2011) identified quality as one of the two factors (the other being access) in early childhood programs that produce equity to develop the positive child outcomes especially in developing countries; however, others have studied the positive effects of early childhood education on all students, not just those of low economic status.

As previously noted, 80 scholars, experts, and activists gathered at a conference in Cambridge, Massachusetts, in 2004, to discuss the effect of quality, early childhood education on the economy and to develop recommendations for policy-makers in advancing such programs, if deemed important (Calman & Tarr-Whelan, 2004). Their conclusion was "quality early education benefits children of all social and economic groups" (p. 2). Economic benefits of these quality programs include reducing costs of remediation and special education, producing higher paying jobs for future workers who in turn, pay higher taxes, and lowering crime and prison costs (Calman & Tarr-Whelan, 2004).

When discussing the positive effects of early childhood programs, quality surfaced again at the national levels. In a report issued by the NIEER, Espinosa (2002) stated

> Research has consistently shown that 3- and 4-year-olds who attend a high-quality preschool are more successful in kindergarten and beyond—both academically and socially. But the majority of preschool programs in the United States are not judged as good, with many rated far below that. (p. 2)

Additional studies also support the positive effect that early childhood experiences have a positive and lasting effect on a child's academic success (Belsky et al., 2007; Dwyer, Chait, & McKee, 2000; Burchinal et al., 2009). These effects are even more apparent in helping to close the achievement gap between children of low- and middle-to-high income families (Burchinal, Hyson, & Zaslow, 2008). Considering these significant studies, early childhood education is capturing the attention of the business world, and policy makers are also taking notice; however, there is an important caveat to these benefits is that the early childhood programs must be high quality.

Measures of Quality

The greatest challenge reported in the literature is identifying consistent criteria for high quality early childhood programs. While similar ideas exist, so does a lack of a consistent, agreed-upon standards and terminology.

According to LaParo, Thomason, Lower, Kintner-Duffy, and Cassidy (2012), the quality of early childhood programs has been judged by both proximal and distal elements of the classroom, depending upon the focus of the assessor. Proximal might include those things that are closely associated within the classrooms (i.e., materials or

curriculum), while distal includes those things affecting the program from the outside (i.e., policy). These criteria tend to be global in their scope. This represents a change from an earlier definition by Dunn (1993) as she cited proximal as the events, and distal as the structures more in line with process and structure.

Mashburn et al. (2008) added other terminology that implies analogous ideas. They consider the quality of a program to be related to infrastructure, or design, and the environment of the classroom. Some of these considerations are tied to state or federal mandates and funding streams. Programs must meet minimum standards, or benchmarks, in order to be considered quality. Benchmarks, which are standards by the National Association for the Education of Young Children (NAEYC, 1997), may be considered. They include standards for areas such as classroom characteristics, class size, teacher training, etc. (Mashburn et al., 2008).

NIEER (Espinosa, 2002) suggested that early childhood programs rate quality according to two more commonly and agreed upon categories: process and structure. Process is usually associated with the experiences that are provided in the classroom and are evaluated according to a rating scale such as the Early Childhood Environmental Rating Scale (ECERS). Areas such as materials and resources that are used, relationships with parents, teacher-child interactions, and classroom environment are assessed and are more difficult to rate. Because process has more to do with experiences, it is also more expensive to assess (Kreader, Ferguson, & Lawrence, 2005). Evaluators must be trained, and evaluations should be conducted by more than one person to establish inter-rater reliability, which adds significant costs to the evaluation.

Structure, on the other hand, has to do with the configuration of the class and teacher qualities. Areas considered include class size, student-teacher ratio, teacher compensation, and training (Espinosa, 2002). While structural qualities are less direct, they are easier for researchers to measure, and certainly less expensive and time-consuming to assess.

Structures are also easier for policy-makers to affect and understand (Kreader et al., 2005). However, policy makers also understand that *regulating* structural qualities can be cost prohibitive and could hinder some providers from being able to continue their services (Early et al., 2007). For instance, requiring all teachers in early childhood programs to have bachelor's degrees may force some programs to close if they are unable to compensate their teachers adequately for the increase degree. Policy makers may believe that it is better for children to receive any early childhood educational services than none at all. When it is necessary to cut budgets rather than increase them, there is little support to increase mandates that could potentially decrease services.

Additionally, policy-makers' comprehension regarding whether an early childhood teacher's training is directly or indirectly related to program quality may exist only within their own contextual understanding as related to other teachers. More specifically, the program may be judged in terms of the same structural qualifications of teachers in elementary and secondary schools to be highly qualified. According to the United States Department of Education, this is determined by "attaining a bachelor's degree or better in the subject taught; obtaining full state teacher certification; and demonstrating knowledge in the subjects taught" (USDE, 2006, n.p.).

Analyzing early childhood programs in the same way as other teachers' certification programs presents an additional problem. Because early childhood education is not mandated nor is identified in No Child Left Behind (NCLB, 2001), there are significant variations between and within states regarding teacher training requirements (NEA, 2010), and many consider early childhood as a younger extension of elementary training. Unfortunately, the lack of mandates does not mitigate the impact an early childhood teacher has on his or her students' learning. In recognition of this concern, the National Institute for Early Education Research (NIEER) specifically recommends that teachers have a bachelor's degree with specialized training or a certificate in early childhood education (Mashburn et al., 2008).

Still other policy makers propose policies for early child care and education without defining quality. A presumed tie exists between programs such as Head Start and quality (Smolensky, 2003). While studies have shown Head Start provides favorable results, information also supports variances in Head Start programs between and within states (Currie & Neidell, 2007). Again, this occurs due to lack of mandates for early childhood programs. Legislators may even offer parents voucher systems to access high quality programs without defining either structural or process quality criterion.

Adams, Tout, and Zaslow, (2007) reported that programs like Head Start or state pre-school programs tend to be higher in quality due to strict funding guidelines; however, while structural areas could be mandated (i.e., teacher qualifications), a quality discrepancy is often observed in the classrooms. This raises the question as to whether a structure, such as teacher training, affects process, and if so, what specifics of the training caused such effects.

These discrepancies were especially true for programs with children from lower income families. Some credence was also given to the fact that children from families with lower incomes experienced greater transiency between child care and education programs. The lack of consistent program implementation could cause such a gap; however, Adams et al. (2007) went as far as to say that inferior early childhood programs for low income children, especially childcare, had the potential to harm children. Many of these programs and facilities are unregulated and provided in homes by friends and neighbors.

In a study of 11 states' Pre-K quality requirements by Howes et al. (2008), six states focused mainly on structural processes such as teacher certification. These states reported greater support for emotional needs of children which may have been a result of the teachers' training; however, the instructional processes tended to be low. Instruction tended to be more whole group and a significant amount of time was devoted to classroom management and routines. Preliminary research found little connection between processes and structure, considering many states focus mainly on the latter, teacher certification to define quality.

However, other researchers also focused on structural processes, specifically teacher training (Austin, 2008; Saluja, Early, & Clifford, 2001; Bryant, Clifford, Early, & Little, 2005), and whether teachers with bachelor's and master's degrees were more effective. They supported the fact that teachers with bachelor's degrees, or specific early childhood training, were more effective; however, they also added the caveat that many of the early childhood programs with the teachers who did not have bachelor's degrees also tended to have students from low-income families. In addition to supporting the

positive effect of teacher training on child outcomes, Saluja et al. (2001) also emphasized that an administrator's training matters. Principals with early childhood training increased the likelihood that the program under his or her leadership would be high quality.

Others argue that when structures such as class size, student and teacher ratio are limited, processes may be refined and improved (Adams et al., 2007). Teachers are more likely to have quality interactions (a process) with children when class sizes are smaller (a structure). On the other hand, teachers that have been trained in specific understanding of child development through early childhood teacher training (a structure) may be more likely to understand the importance of delivering curriculum in a specific way (a process). This may account for variances in study results when controlling for such interactions.

Kelton, Talan, and Bloom (2013) reported that over the past few decades of research, support has been gained to organize findings and establish Quality Rating and Improvement Systems (QRIS). These systems are often devised around process and structural measures. States often monitor processes through QRIS, but they tend to regulate structural areas (Adams et al., 2007). More than half of the states have designed and implemented such systems; however, once again, like other state requirements for early childhood programs, they are not consistent across state borders. Some systems are based on assessment scales that have been assigned cut scores based on "best guesses" rather than researched data.

LaParo, Thomason, Lower, Kintner-Duffy, and Cassidy (2012) offered continuing support of the lack of consistency in identifying criteria for quality in rating systems. Not

only did they identify process and structure as quality considerations in research, but they also suggested recognized global quality which includes process and structure as components. Their concern for each of these components is that they have been defined differently, according to various research studies. Furthermore, they suggest that because quality in early childhood programs is truly multidimensional, it's difficult to use one QRIS instrument (i.e., Early Childhood Environment Rating Scale – Revised [ECERS-R]), which is used to measure the quality of many programs. Their research identified outdoor environments and emotional climate as two additional areas for consideration that are not measured by ECERS-R. Furthermore, they discovered that even when using the same instrument, quality was often defined differently. This poses a significant obstacle to its standardization.

Ackerman (2005) suggested that policy makers, parents, and others in the community will assume quality when there is a licensure by the state; however, this could, in fact, only indicate that minimum standards are met, as opposed to the program being high quality. The standards are set at "the floor" rather than the ceiling of quality. Using an effective QRIS, as some states have done, will assist in helping the lay person identify a program's quality, but if the QRIS is not based on appropriate researched-based criteria, it will not produce the outcomes desired.

Pennsylvania devised the Keystone Standards, Training/Professional Development, Assistance, Resources, and Support (STARS) program as a rating system based on scores on the Environmental Rating System (ERS) to define levels of quality for early childhood care and education programs, and included areas of both process and structure. Three areas that were identified as increasing scores on the ERS are programs

with defined curriculums, teachers with college degrees (minimally an associate's degree), and ongoing professional development (Barnard, Smith, Etheridge, & Swanson, 2006). The Keystone STARS program was implemented after the results of a study using the ERS in 2002 indicated a significant drop in scores from previous studies conducted in the 1980s and 1990s. The goal of the STARS rating system was to reverse the decrease in quality. The 2006 study by the University of Pittsburgh Office of Child Development and Pennsylvania State University Office of Child Development and Early Learning (OCDEL) Research Center indicated significant improvement on the ERS after the STARS implementation, giving credence to such rating systems (OCDEL, 2012).

Barnett (1995) reviewed 36 studies and concluded that the model programs tended to have greater effect size than larger scale programs. He cited the higher quality of the smaller programs as one reason, listing structural characteristics of class size, more staff members, and higher education of the teachers as indicators of quality.

Referencing the National Research Council's, *Eager to Learn: Educating Our Preschoolers* (Bowman, Donovan, & Burns, 2001), developmentally appropriate practices are essential to an early childhood program. Understanding developmentally appropriate practices addresses the teachers' or caregivers' training, as well as the practices used in the classroom or center. This addresses structural and process issues. The understanding that children develop in a variety of ways, at different times and progressions, are important in providing a high quality, early childhood experience. Additionally, the following were identified as components of a high quality program:

- quality teacher-child relationship;
- low adult-child ratios;

- curriculum that is specific and integrated across domains (i.e., math, language and a variety of structures);
- assurance that children who are at greater risk for school failure are provided opportunities to attend;
- professional development for teachers that is specific to classroom behaviors; and
- supervision by high quality individuals that encourage reflection on the teachers' practices.

The Organization for Economic Co-operation and Development (OECD, 2012) lists five areas for effective, quality, early childhood education. They include "setting out quality goals and regulations, designing and implementing curriculum and standards, improving qualifications, training and working conditions, engaging families and communities, and advancing data collection, research and monitoring" (p. 9). These areas are a mixture of both process and structural areas that indicate that both areas are important in defining quality.

Chambers, Cheung, Slavin, Smith, and Laurenzano (2010) reviewed the outcomes of 36 studies of 27 early childhood programs. One of the findings that they identified, with caution, was that gains found in academic programs tended to be short term, while programs that focused on cognitive skills tended to have longer lasting effects. Both programs tended to focus on process areas like curriculum objectives and delivery. They also identified the support given to the teachers in implementing the programs. This could be considered a structural area, since it has to do with professional development and teacher training.

In a discussion on closing the achievement gap for children of different races and ethnicities, Magnuson and Waldfogel (2005) focused on four strategies for increasing the quality of early childhood programs that include both structure and process. These strategies include:

- ensuring structural parameters in regards to class size;
- student-teacher ratios;
- securing teachers trained on early childhood methods;
- training teachers to identify behavioral, social, and emotional deficits;
- providing parents with the skills to reinforce the academic and emotional learning happening in the classroom; and
- employing staff that can identify health problems in children and provide parents assistance in addressing such problems.

In a document researched and published by the DE, *Building Strong Foundations for Early Learning: The U.S. Department of Education's Guide to High-Quality Early Childhood Education Programs* (Dwyer, Chait, & McKee, 2000), indicators of high quality early childhood programs were provided to assist public schools in considering how to design new programs or assess the quality of their current programs. These indicators included:

- identification of a child's developmental level;
- concentration of attention to a child's specific needs;
- teachers' expertise in understanding and implementing the development of skills and practices;

- introduction and connection to knowledge of early childhood development to parents;
- access for all children to have and benefit from quality early childhood programs, especially those who have lower income backgrounds;
- consistency of adults and programs that will benefit children during early childhood programs; and
- provision of quality resources to yield a higher return on investment.

According to the *State of Preschool 2013* (Barnett, Carolan, Squires, & Clarke-Brown, 2013), a list of 10, research-based, quality standards was developed to benchmark early learning programs across states. While they indicate potential quality programs, they in no way guarantee quality if other parameters don't exist, such as professional development requirements that translate into random workshops with no accountability attached. Out of 40 states and Washington, DC, only five states met all 10 benchmarks, and, likewise, five states met fewer than five benchmarks. It was even suggested that not all standards should be considered equally important; however, state program directors may value one over another for different reasons, and seek to meet their priority standard first.

Burchinal et al. (2009) acknowledged the positive link between measures of quality early childhood programs and child development outcomes in individual studies; however, they questioned the strength of the connections across studies. They completed both a meta-analysis of early childhood, peer-reviewed journal studies and a secondary analysis of four large early childhood studies. Both the Early Childhood Environment Rating Scale ([ECERS], used for evaluating the classroom environment) and the

Classroom Assessment Scoring System ([CLASS], used to measure the quality of classroom interactions between adults and children) provided data. While the relationship between the quality of the early childhood program and the child outcomes was positive, its strength was modest. This was especially true in the meta-analysis and the secondary study that provided a slightly stronger relationship. One of the implications they cited was that the existing measures of quality are not adequate to detect the linkages between the scope of interactions and the environment that are most strongly connected to child outcomes. They suggested that refining existing measurements or developing new measurement instruments would assist in identifying more precise quality indicators.

Britto, Yoshikawa, and Boller (2011) concurred with the need to refine the research of quality early childhood programs. They suggest that in the quest to simply find significant outcomes of research, implementation factors may be missed. As their study focused on global, early childhood quality, they propose that the degree and fidelity of program implementation by staff is not always consistent, or considered in studies. In addition, local factors may also that affect implementation and should, in fact, be evaluated on local needs. A one-size-fits-all approach to early childhood quality evaluation may not be accurate or appropriate.

In 2009 the Council of Chief State School Officers (2012) adopted a policy statement that emphasized the extreme importance of quality early childhood education emphasizing "A quiet crisis is threatening America. Deeply rooted achievement gaps and shortfalls, and a lack of high quality early learning opportunities compromise the potential of too many children" (p. 2). This policy statement led to a challenge to state

educational leaders to identify successful strategies in improving opportunities for children to engage in high quality, early childhood education.

While significant research exists that supports early childhood education, especially high quality early childhood education as presented, little agreement exists as to what high quality means, thus, the challenge of the Council of Chief State School Officers. If research supports the benefits of quality early childhood programs, it needs to continue to define the effective characteristics of such programs. One area for criteria that continues to present itself is teacher training (Hyson, Tomlinson, & Morris, 2009). Exploring effective teacher training programs is necessary.

Early Childhood Teacher Training

One of the measures of the structural area of early learning is the education and training of the staff (Espinosa, 2002), especially its teachers. An important reason to identify the effectiveness of teacher training is that personnel costs account for approximately 85% of a program (Bogard, Traylor, & Takanishi, 2008), and many early childhood programs, like Head Start, use federal funds to support their operations. If these funds are to be justified to the tax payer, early childhood education programs need to provide evidence that they are successful. Teachers must have the knowledge and skills to promote and engage students in learning; therefore, it is critical to train them to provide appropriate experiences to ensure learning outcomes are realized.

Regardless of the child's age, wide-range support suggests that teachers play a critical role in student success (Humphrey, Koppich, & Hough, 2005; Darling-Hammond, 2000). In the Obama Administration's report, *Our Future, Our Teachers* (2011), the Chiefs for Change established that "Research has shown that teachers are the most important school-based factor in determining student achievement" (p. 3). Linda

Darling-Hammond (2009) concurred that "Every aspect of school reform -- the creation of more challenging curriculum, the use of ambitious assessments, the implementation of decentralized management, the invention of new model schools and programs -- depends on highly-skilled teachers" (p.1).

In previous research, Darling-Hammond (2006) conducted a study in South Carolina that reported results that showed the significance of a quality teacher. One study was. Teacher qualifications accounted for 64% of the variance of students' outcomes. Subsequently, by adding a poverty and minority factor, the variance was as much as 84% between those whose teachers were well-qualified. Without the knowledge and skills to identify students' developmental needs and learning styles, teachers were not able to provide appropriate instruction.

The question that looms over this research is how to determine and/or develop a quality teacher. According to United States legislators, highly-skilled teachers should be highly-qualified, as defined by NCLB (DE, 2006). One of the requirements of NCLB to be considered highly qualified is that teachers should hold a bachelor's degree. The implication for early childhood programs is that their teachers should also have bachelor's degrees in order to be highly qualified. At a basic level, this could be problematic as the number of teachers certified in early childhood education has declined since the early 1980s, mainly due to the lack of sustainable wages and benefits compared to public school teachers (Herzenberg & Price, 2005); however, a review of research indicates that simply certifying teachers, regardless of the level taught, doesn't necessarily make a quality teacher.

There is a paucity of existing research on effective teacher education and certification programs, especially in the area of early childhood education. There is so much variation in regards to these programs that some studies suggest that education and certification are not consistently related to higher quality classrooms (Bogard, Traylor, & Takanishi, 2008). While some of these studies include both K-12 and Pre-K programs, they fail to account for the fact that not all of the Pre-K teachers held bachelor's degrees, as was required of all of the K-12 teachers. This could be an important factor if legislators consider making changes to educational requirements, especially for early childhood educators who are already affected by inconsistency.

In addition to the lack of consistency, Humphrey, Koppich, & Hough (2005) submitted that teacher certification programs represent the floor (or minimal) of expectations for a teacher. If this is true, and each program has its own interpretation of the floor, it would support the lack of consistency, in relationship to quality. There are those that believe certification isn't enough. Teachers should demonstrate their effectiveness in the classroom.

Palardy and Rumberger (2008) agreed that the results of studies are inconsistent in connecting the teacher's training background with positive effects on student achievement, with the possible exception of some indirect effects, such as the introduction of specific reading programs within a pre-service course that may instigate an increase in student learning. They found that teacher attitudes and beliefs were far more significant in determining child outcomes than the certification of the teacher.

In the literature review for their study of teacher effectiveness, Chingos and Peterson (2011) suggested that research does not support a positive relationship between

teachers' pre-service training and student learning. A study conducted in Florida reported that alternative training programs for teachers may produce teachers who are similarly effective as those who are traditionally trained.

In a study conducted in the New York City School District, Kane, Rockoff, and Stagier (2008) compared student achievement outcomes for math and reading. Some students received instruction from teachers who were certified through traditional programs, and others from teachers who were alternatively certified (i.e., Teach for America). The results indicated little difference between traditionally trained teachers and alternatively certified teachers. They found the greatest difference was simply that some teachers were more effective regardless of certification. Their suggestion was to develop a strategy to determine how to retain more effective teachers as their effectiveness increased even more with experience.

Shulman (2005) suggested that teacher certification programs should design "signature pedagogies" (p. 15) that would make them similar to the training of other professions like lawyers, doctors, and ministers. However, there is little agreement or consistency exists between and within states as to how teachers should be taught to think, know, and behave like teachers. Shulman proposes that educating teachers in consistent methodologies could have a positive and significant impact on student learning. Standard practices would provide those in certification programs a more focused view of how to train a highly-qualified teacher. Early childhood certification programs would then have a model to follow, as well.

Professions that have standards of practice are most often monitored within the ranks of those who belong to the profession, such as medicine and psychology (Darling-

Hammond, 2006). They use national accreditation programs to define the highest levels of competence. While an accreditation program exists within the teaching profession through the National Council for Accreditation of Teacher Education (NCATE, 2010), it is not recognized as the acceptable standard for certification across states. According to Darling-Hammond (2006), "They [NCATE] incorporate deep understanding of content and how to teach it, a strong appreciation for the role of culture and context in child development and learning, and an insistence on ongoing assessment and adaptation of teaching to promote learning for all students" (p. 7).

Perhaps one reason that the lack of common standards and certification programs is so devastating is the recent shift in education from "teaching" to "learning" (Levine, 2006). The Common Core Standards have caused an emphasis on what students should know and be able to do when they graduate from high school (About the Standards, 2014). Learning is scaffolded, and the current year's learning is predicated on the learning of the previous year, and the one before, and soon. With this national shift of common learning outcomes, developing common certification standards and practices for educators across and within state borders becomes even more important. Common practices among teachers that provide the greatest success rate for students are essential. When such standards and certifications are developed through research that promotes the greatest learning for "all students," early childhood teachers' practices are impacted, andso produce significantly greater learning for young children. However, there is not much difference in consistency specific to early childhood programs than traditional, teacher certification programs. Reviewing research specific to early childhood certification programs and training is necessary as well.

Reifel (2011) identified early childhood teacher training in the late nineteenth and early twentieth century as prescriptive. Teachers were trained to get children to count and march in specific ways; however, these methods gave way to the importance of observation and questioning children to learn more about their emotional and social needs, as well as their interests. Educating the "whole" child became an important focus. Without understanding all "parts" of the child, this was impossible to do.

As of 2007, fewer than half of the early childhood programs had been approved by NCATE (Hyson, Tomlinson & Morris, 2009). Although reasons abound why this might be true (i.e., some higher education institutions do not participate in NCATE), it would be beneficial to take a closer look at the programs that were successful in the accreditation process to identify commonalities, as well as further research on their graduated, certified teachers in relation to the outcomes of children in the classrooms that they teach.

Alverno College in Milwaukee, Wisconsin, is an example of an NCATE accredited school that offers a unique program. Alverno's program uses an outcomes-based, teacher education focus that includes early childhood education (Levine, 2006). Pre-service teachers must demonstrate mastery of 40 competencies in eight different areas. They must complete a minimum of 100 hours of field work focused on four different experiences. One of the strengths of the program is, in the final experience, pre-service teachers deliver eight lessons, and, a pre- and post-assessment is given to determine how much learning occurred. They also develop a portfolio that includes logs, self-assessments, and a case study focused on the student learning, and what evidence demonstrates that learning took place.

Marcy Whitebook, who heads the Center for the Study of Child Care Educators at U.C. Berkeley, admits a strong link has not been established between simply holding a bachelor's degree and improving student outcomes for young children (Mongeau, 2013); however, bachelor's degrees differ, especially those that provide specific training in early childhood teaching and developmentally appropriate practices. Confirming this were the results of the 2008 Leadership Symposium sponsored by the National Center for Research on Early Childhood Education (Howes et al., 2008).

> ECE teachers may have either formal education *or* training to be considered effective teachers in some systems, education is as likely to be in-service as pre-service, and, in many cases, students receiving pre-service in ECE at the four-year college level never actually teach in the ECE system. (p. 3)

Pianta (2006) submitted that teacher certification has little to do with child outcomes. Outcomes are best measured through some kind of accountability system to ensure that students are learning. Observations of interactions between the teacher and students in the classroom will provide greater support for quality than a certification program. Only when a certification program includes specific training and practice on these interactions does the certification matter; even then, it would be specific to the program that provided such training and practice.

Pianta (2006) further proposed that beyond certification, since there is no consistency across programs within and between states, professional development plays a key role. However, the key to effective professional development is not whether or not the teacher attended the activity, but the observed effect of the activity within the

classroom afterward. Using a standardized observation tool, such as CLASS would assist in determining the effectiveness of the professional development.

Pianta, Barnett, Burchinal, and Thornburg (2010) later reported that most states require kindergarten teachers to have a minimum of a bachelor's degree in order to teach in the public schools; however, the same standard is not held for pre-school teachers. This includes a wide variance among states with state-funded programs. Some require bachelor's degrees, while others require an associate degree, without a certificate focus. Standards for states are often linked to teachers of public school age children and not education before kindergarten.

Bogard, Traylor, and Takanishi (2008) took the certification challenge a step further. They questioned the benefit of having a two-tiered system that defines separate criteria for early childhood programs of Pre-K and K-3, even though they are both considered, by definition, as early childhood education. The Pre-K teachers may only be required to have an associate's degree or a high school diploma, while the K-3 teachers must have a bachelor's degree. This becomes especially apparent as more public schools are adding preschool classrooms to their education systems. Discrepancies between certification requirements for early childhood teachers and K12 teachers can cause divisions between staff in form of salaries and benefits, even though both hold the position of teacher. Additionally, the lower pay scale for non-certified teachers may invite a greater turnover rate. This can be quite costly for districts when consideration is given to a unified staff, the investment in professional development, and the quality of teaching that develops over time.

Some early childhood certification programs stretch the age range between three and eight years of age (Maxwell, Lim, & Early, 2006); however, is questioned as to how specific or broad such programs can be in their scope of training. The question has surfaced as to whether such programs are capable of providing the developmental insights for children without limiting the teachers' job marketability. This presents itself as a concern as states, like Pennsylvania, have adopted narrower program certifications.

The National Association for the Education of Young Children (NAEYC) revised its standards for early education programs in 2009 (NAEYC, 2009b). When the first standards were released, they included separate standards for bachelor and associate degrees, and later added standards for graduate degrees. In 2009, however, they issued a position statement that all programs should address the need to prepare all early childhood professionals for careers "regardless of role, setting, or degree level" (NAEYC, 2009a, p. 2). This was a bold statement that provided a definite distinction between elementary teacher preparation and early childhood teacher preparation. Early childhood education programs were no longer about training specifically for those pursuing general teaching careers. Skills and knowledge needed to address the demands of all aspects of early childhood, including the child and family, were identified as necessary for all those seeking careers with young children.

These standards represent a move away from "in-put based" pre-service training to "out-put based" training. They helped define what teachers of young children should know *and* be able to do as opposed to what they should simply know (Hyson, Tomlinson, & Morris, 2009). Evaluators could determine if pre-service teachers evidenced such skills in actual practice with children, rather than simply passing written tests or writing

papers. This would entail a more focused, pre-service teaching experience, also known as student teaching. While the pre-service teaching experience is supposed to provide a critical evaluation of the student teacher's skills, it is too often, simply a checklist of experiences that do not evaluate the actual learning outcomes of the children in the classroom.

The National Board for Professional Teaching Standards (NBPTS) is a non-profit and non-partisan organization that defines standards for what a teacher should know and be able to do (NBPTS, 2012). With its core purpose to increase student learning and achievement, it delineates specific knowledge and skills that are necessary for teachers of various levels to master, in order to be most effective in their respective classrooms. The Early Childhood generalist level aligns closely to the standards identified by NAEYC. They recognize the importance of understanding the developing child, the diversity of children's culture and context, and the critical role the family plays in a child's development. This program assists in standardizing what teachers should know and be able to do at a national level, since state certification programs have not been able to do so across borders. Perhaps most importantly, the standards are aligned and updated to professional work and research to assure that teachers' learning is the most current and effective. Teachers who participated in the NBPTS certification process for early childhood education perceived that they used developmentally appropriate practice(DAP) to a greater degree in their classrooms than those who were not (McKenzie, 2013).

Additionally, LeMoine (2008) believed early childhood certification programs must also address the need for teachers to be familiar with curriculum delivered in the early childhood classroom. This curriculum focuses on a variety of needs, including the

diversity of children that early learning teachers will instruct. The various differences may include cultural, language and learning needs, and disabilities (NAEYC, 2009a). The more diverse our country becomes, the more important the need to ensure that those who start the educational journey for our youngest students are adequately prepared. Additional gaps may also include the gaps caused by socio-economic issues. Children need to learn that the differences among themselves are to be appreciated and embraced (Copple & Bredekamp, 2009). Working and playing together in a collaborative way, and appreciating their differences benefits each child as he or she begins the journey to adulthood. The early childhood teacher must be able to facilitate this learning.

Cunningham (2014) proposed that for instructors of early education, teacher training programs should use developmentally appropriate practices for their students. Students should be introduced to DAP for young children by working through a constructivist approach. They should be allowed to build their own understanding of DAP. They would first analyze the materials and curriculum that would be used with children, develop lessons and activities, and then use them with children. This process builds greater confidence among pre-service teachers in their abilities to provide developmentally appropriate instruction.

While the curricula in the pre-service program is seen as important, there is an additional belief that those who are delivering the curricula in these programs are also vital to the success of students in the programs (NAEYC, 2009b). Students must feel that instructors in the pre-service programs care about them and their learning. The instructors need to engage their students in a well-organized curriculum as well as assess them in meaningful ways. Instructors must provide the same experiences that they expect

the teacher to provide to the children and highlight the fact that it is important for teachers to be intentional about their teaching (Copple & Bredekamp, 2009).

Additionally, pre-service teachers need to understand why they provide certain experiences and structures for early learners. For instance, there are specific reasons that each area identified by the NAEYC (community of learners, families, teaching, curriculum, and assessment) is incorporated into the learning experience; and teachers need to recognize how each improves the development of the early learner. Intentionally incorporating each area increases the likelihood that children's learning and development will be maximized. Ultimately, the instructors in the certification programs impact the learning of both the future teachers and their early childhood students.

In addition to the relational aspect of the instructors, Lima, Able-Booneb, and Zimmer (2009) suggested that the diversity of the higher education faculty also plays an important part regarding the inclusion and emphasis of diversity education. They are more likely to insist that curricular adaptations are made to ensure educators are aware and equipped with the knowledge and strategies to address diverse cultures and needs in their classrooms. Lima et al. also found that the location of the institute (rural or urban) played a role in the diversity of the faculty as well as the focus on diversity of the curricula.

NAEYC (2009) also included a standard for professional early childhood teacher preparation that focused on professionalism. Teachers of early learners should have a sense of what it means to be part of a learning community that is always seeking to improve its practice by reflection and collaboration with others in the field. Professionalism also includes synthesizing information from a variety of sources to

develop more effective ways to help students learn. These include in-service opportunities provided by the educational organization (Palardy & Neuharth-Pritchett, 2010).

Early et al. (2006) reflected on three areas when considering teacher certification: the number of years the teacher was educated, the highest degree the teacher achieved, and whether or not the teacher received a bachelor's degree. The only positive connection they could make was an increase in math skills. For children in early childhood programs literacy is a primary focus and it did not appear to have a connection to teacher certification.

Vartuli's (1999) study on *How Early Childhood Teacher Beliefs Vary Across Grade Level*s proposed that teachers at different grade levels tended to emphasize different areas depending on the grade levels (i.e., socialization or skills). These areas of emphasis may be supported through the philosophies of certain programs. A teacher with an early childhood certification may tend to stress learning through play and socialization. However, a second grade teacher with an elementary certificate may place more value on developing skills. A difference might exist in the number of child development courses required in each elementary certification program. Vartuli also noted that there may be a significant difference between reported beliefs by teachers and their actual practice in the classroom. Certification program philosophies and requirements can also have a significant impact.

Chingos (2010) suggested the opposite, although he admitted to limited research. He proposed that the experiences teachers receive in the classroom associated with actual "on the job training" (p. 30) have an effect on student achievement. Teacher

certification, university or advanced degrees, are not correlated with the teacher's effectiveness. There is the potential, however, that, if specific programs are reviewed separately, one may provide greater effectiveness than others.

Developmentally Appropriate Practice and Teacher Training

Reviewing the concept of DAP, and the research associated with it, is important in understanding the impact early childhood teachers' training has on child outcomes. This is especially true as state boards of education and policy makers consider certification requirements.

According to Buchanan et al. (1998) the roots of DAP are found in various theoretical perspectives. They include constructivism, behaviorism, and socio cultural theory. Grisham-Brown (2009) concurred; however, she also added ecological systems theory. These systems were introduced by Urie Bronfenbrenner, who believed that children were influenced by five, complex systems that interact. These systems are represented by different levels of their environment, and they include: microsystem, mesosystem, exosystem, macrosystem and chronosystems.

McHale, Dotterer, and Kim (2009) provided insight into these systems. Microsystems are those with whom the child has direct interaction such as family and school. Mesosystems are the points where their microsystems intersect. These points of intersection may serve to solidify values, or place them in conflict, as a child moves between the microsystems. Exosystems are the indirect influences on a child. An example of an exosystem is the influences of a child based on the influences of his parents' work. A parent may encourage a child to pursue a particular sport, hobby, or educational opportunity based on information garnered at work. This may even translate into competition between parents for their children to be successful. Macrosystems are

more abstract, yet potentially relatively influential. They encompass the cultural or political influences on a child. For instance, some cultures place a high value on academics, while others place a greater worth on athletic abilities. Finally, the chronosystems involve the transitions of life. The child may be positively or negatively influenced by transitions such as divorce or a marriage (Sincero, 2012).

These intertwined systems influenced the structure of the DAP programs. NAEYC first presented their position on developmentally appropriateness that acknowledged these systems by addressing four components of an early childhood program: curriculum, adult-child interactions, relationship between home and program, and developmental evaluation of children (NAEYC, 1986). The ideas of both age appropriateness and individual appropriateness were considered in each of these components.

Carta, Atwater, Schwartz, and McConnell (1993) identified six important indicators of programs that are developmentally appropriate. The first is a de-emphasis on standardized testing, and an emphasis on multi-faceted assessments. A variety of ways should be used to assess children's learning without relying solely on psychometric tests. This leads to the next indicator of integrating assessment within the curriculum. Children's learning should be assessed as the curriculum and instruction are delivered. Confirming that a child has learned a skill or concept, as it is being taught, is critical to scaffolding their learning.

Another indicator is allowing children to initiate learning by choosing activities that interest them. Children learn best when they feel invested in their learning. Choices are provided that invite the child to interact in learning activities that are interesting

and/or strengths of the child (Hart, Burts, & Charlesworth, 1997). This also supports the next indicator where children are engaged in their environment and learning. When children interact with their own environment that they know or want to explore, learning is more likely to occur. This exploration assists in developing the indicator that emphasizes social interactions. Children learn and grow in a variety of ways including language, reasoning, and social skills when they interact with their peers and adults (Bredekamp, 1993). Learning appropriate ways to relate to others is critical in a child's development.

A final indicator of DAP programs is introducing children to multicultural experiences. Children learn how to accept and embrace people from different backgrounds, abilities, and cultures through early exposure to diverse groups of people. Brain research supports the importance of the multicultural indicator in the DAP classroom as it identifies the need for children to make connections via neural pathways in the brain (Jacobs, 2001). Meaningful activities that involve conversations between people, as well as purposeful interactions with materials, assist in making these connections, resulting in learning (Charlesworth, 1998). This is especially important when recognizing language differences between cultural and economic groups. Being cognizant of differences in vocabulary usage is necessary to bridge gaps in understanding.

Subsequently, the previously mentioned indicators are representative of three principles that assist in guiding educators in making decisions for children based on DAP as identified by Kostelnik and Grady (2009). They include knowledge of the following: how children develop and learn, individual children's strengths, needs, and interests, and

the social and cultural contexts in which children live. These principles are considered as teachers in DAP classrooms prepare and implement lessons and instructional activities. Through observation of children, the trained teacher is able to make decisions when a child is ready to be introduced to the next step of learning. Learning becomes much more individualized and tailored to a child's needs (Hart, Burts, & Charlesworth, 1997), and the experienced teacher is able to match a child's interests with the next learning for which the child is ready (Bredekamp, 1993).

These indicators are a contrast to learning in Developmentally Inappropriate Practice (DIP) classrooms that are much more didactic and traditional. Direct instruction is provided to groups of children. Everyone receives the same instruction in the same way. Worksheets, workbooks, and rote learning are often the mode to disseminate content and concepts, and the content is most often delivered through subject areas of math, science, and reading (Hart, Burts, & Charlesworth, 1997; Charlesworth et al., 1993). *Teachers trained within traditional certification programs would likely implement this kind of instruction.*

In order for educators to use DAP for all children, considerations are needed for both the age appropriateness and individual appropriateness of practices (Bredekamp, 1993). NAEYC identifies reasonable expectations for children at chronological ages, however, they also promote the need to look at children individually and make adaptations as appropriate as a child's developmental level may not match his or her chronological age. This has become an issue when considering early childhood education for children with disabilities.

Brown and Lee (2012) suggested that caution should be considered with the widely accepted definition of DAP provided by NAEYC that focuses mainly on individual strengths and sets benchmarks of development. Some may consider the benchmarks of development as what a "normal" child should do and be like, and not all children follow the "normal" pattern. Lubeck (1998) challenged this thinking as well. She questioned the lack of conversation between professionals, especially teachers, when considering what is "normal" or best for a child within his or her context.

Bredekamp (1993) also cautioned that considerations should be given in regards to chronological age versus developmental age. The two may be different among children and should be considered when making decisions about what is developmentally appropriate for individual children. This requires significant understanding of growth and development in order to for decisions to be made about children as objectively as possible.

Ernest (2001) advised that the practices considered "developmentally appropriate" by NAEYC are subjective. NAEYC identified developmentally appropriate practices for educating young children based on their strongly held beliefs in regards to how children learn. There is room for interpretation and the conversations need to continue in order to ensure that evolving information is considered. NAEYC has revised their position statement a number of times since its first publication in 1986.

While there is widespread support for DAP, albeit the previously mentioned cautions, there are those who would question its value. Shiakou and Belsky (2009) specifically studied the effect of students' social and emotional development when teachers' and parents' attitudes and practices were found either to be developmentally

appropriate practices (DAP) or developmentally inappropriate practices (DIP) as rated by observation and survey. Their results suggested that the benefits are exaggerated, and although they admit their study had a number of limitations, (i.e., its size and non-randomization), they found limited correlation that would support that DAP makes a difference on students' social and emotional development.

Van Horn, Karlin, Ramey, Aldridge, and Snyder (2005) cited inaccurate research methodologies used to evaluate the effectiveness of DAP in the studies they reviewed. One of the main concerns was that studies often treat student results as independent of each other when, in fact, they are dependent and a nested research design should have been used for the DAP classroom. Additionally, analyses that were conducted produced either inflated or deflated results due to potential unreliable observation ratings, especially for those self-reported by teachers. Furthermore, some sample sizes could only account for large effects. As researched, the results were mixed in reference to academics; however, there were more consistent positive results for children in DAP classrooms as related to lower stress and anxiety levels (Van Horn & Ramey, 2003).

Although Bredekamp (1993) pointed out cautions with DAP, she also cited that some criticisms may be due to misunderstandings of DAP. One is that children learn only according to their interests and there is no written curriculum. DAP suggests the use of children's interest to accomplish the goals in the curriculum which doesn't just include academic goals but social and emotional goals also. Another misconception is that the teacher should never use direct instruction. While it should not be the sole vehicle to deliver instruction, there are times when it is appropriate. A third misconception that would make DAP inappropriate for children with disabilities is that it focuses only on the

child's interests and not his needs. NAEYC's position stresses meeting both the needs and interests of children as individuals.

In an updated position statement of developmentally appropriate practices, NAEYC (2009) addressed the need to acknowledge additional research. They suggested three main areas to consider when making decisions about children: current knowledge about child development and learning, knowledge about the individual child gathered through various venues, such as observation and interviews, and the context of the child's life, including social and cultural aspects. These considerations were important for early childhood certification programs in relation to the teacher candidates' knowledge about children's learning and knowing how to assess their learning.

Epstein (2007) promoted the idea of *intentional teaching* that supports the idea of DAP. Teachers' pedagogy must be carefully planned and deliberate. Epstein (2007) defined pedagogy as "the ways teachers promote children's development and learning" (p. 5). Children need to experience learning environments that are enriching, safe, healthy, and respectful of their differences. Their learning environments should include learning opportunities that are both teacher- and child-directed, and *intentionally* choose when each should be used and is appropriate. Becoming adept at this *intentionality* requires training and much practice where feedback and coaching is provided.

Schiller and Willis (2008) also promoted intentional planning to use brain-based research strategies that promote learning. These strategies are not just focused on academics. They include using DAPs that align with brain research. Teachers need to have an understanding of the brain-based research in order to address the needs of the whole child, including making him feel safe, understanding his uniqueness, and using

multi-sensory approaches. As with Epstein's (2007) *Intentional Teaching*, teachers require specific training, practice, and coaching in order to become skilled in such pedagogy.

Watson, Leibbrand, and NCATE (2010) suggested that understanding the development of the child is key to being able to assist the child to not simply learn, but grow into a productive and caring citizen. They suggest that a teacher who is not committed to understand the development of her students is like a coach not understanding where her athletes are in relation to their skills, strengths, and prior experience of the sport or activity. If a child is going to develop to his full potential, the teacher needs to be committed to the belief that the developmental process is crucial to the child's success.

Both teachers and parents need to understand and commit to the importance of the DAP philosophy. After studying kindergarten teachers struggle to be developmentally appropriate, as well as meet the expectations of first grade teachers in the climate of rigorous state standards as demanded by NCLB, Goldstein (2008) highlighted the teachers' commitment to DAP as an avenue to learning. They found it vital to communicate, to both teachers and parents, the value of learning through DAP. DAP should not be seen as simply "play", but effective instruction that resulted in academic learning. Philosophical beliefs may contribute to this perception.

Most recently, Brown and Mowery (2015) introduced "Rigorous DAP" (p. 40) that incorporates both rigors of national standards and the appropriateness of early childhood practices. For policy makers and school administrators who are driven by rigorous standards, yet wrestle with the need to be developmentally appropriate for

children through eight years of age, it can prove beneficial. In order to implement rigorous DAP with success, the teacher must be skilled in understanding the knowledge and skills expected to be acquired, as well as the appropriate levels of children's development. This requires rigorous training for the teacher.

In a study that looked at the beliefs of developmentally appropriate practices of both teachers and teacher assistants, a difference connected to their educational levels was found; however, it was also noted that the significance of the differences must also be studied in terms of the majors of the teachers, their experience levels, and professional development opportunities (Jisu & Neuharth-Pritchett, 2010).

Trivette, Dunst, Hamby, and Meter (2012) concurred with research that beliefs influence practice. They conducted a meta-analysis of early childhood research studies and concluded that belief judgments were related to the likelihood that early childhood teachers would adopt and use specific practices such as DAP in their classrooms. These findings may be a source of consideration when supervisors determine which practitioners are most likely to adhere to specific program philosophies, like Head Start. Legislation enacted in 2007 focused on Head Start (HR 1429-PL 110-134) and defined educational levels, majors for teachers, and professional development for teachers in Head Start programs. Those responsible for hiring in Head Start programs may well be served by considering such research when screening and interviewing candidates, in areas of early childhood background versus elementary background.

Additionally, Bredekamp (1993) suggested that credentialing institutions often consider programs for early childhood as starting with three- and four-year-old children. This could affect teachers' abilities to provide developmentally appropriate practices if

children's chronological and developmental ages are not the same, especially as students grow older. While early childhood is defined as birth through age eight, there is often a greater differentiation between belief systems in early childhood and elementary training programs that include crossovers in age groups (Lara-Cinisomo, Fuligni, Daugherty, Howes, & Karoly, 2009).

While DAP is prevalent among early childhood educators, consideration should be given to how teachers are introduced to it. Kim (2011) suggested that a significant difference exists between the impact of training teachers who receive in-service as opposed to preservice DAP instruction. Teachers who have experience in their own classrooms, with their own students, may not be as open to changing their beliefs and practices; however, when teachers are trained before beliefs have been established, there is a greater impact for developmentally appropriate practices to be established.

The philosophy of the educational institution also plays an important role. With respect to developmental philosophy, institutions often adhere to either Piaget's or Vygotsky's work with a difference in the roles of the teacher when considering each philosophy. The former sees the teacher as the observer of children as they discover and work their learning through independent activities; the later facilitates the next step of learning when it is observed that the child is ready for it (Grisham-Brown, 2009). For example, Piaget saw play as the vehicle for developing processes that would lead to the next developmental step in a systematic order. Vygotsky, on the other hand, proposed that written language might be introduced as a natural connection to oral language in its symbolic form (NAEYC, 1997); when the child evidences readiness to be introduced to written language, the teacher proceeds to make the connection at that moment.

Teacher beliefs were strongly correlated to DAP and DIP in a study by Stipek and Byler (1997). They found that teachers believed that children learned best through either more directed academic learning or stronger, child-centered learning. These beliefs were more strongly correlated to their beliefs about the goal of early learning, such as academic skills or problem solving and social skills. The higher the grade level the more likely the beliefs focused on academics.

In a study by Lin, Lawrence and Gorrell (2003) teachers' views regarding indicators of children's readiness for kindergarten were studied. They found that the age of the teacher was related to a difference in the level of importance she placed on the academic achievement of the child entering kindergarten. One possible reason that was given for this was the licensure program for the teacher. Institutions that train and certify teachers were influenced by the increased expectation at the national level for academic achievement. Younger teachers' beliefs and experience in practice would reflect the emphasis on academics.

Wen's, Elicker's, and McMullen's (2011) research supported the importance of the belief systems that teachers adopt through their credential training. There was greater correlation, not only between teachers' reported beliefs and their reported practices, but for their reported beliefs and observed practices. Those teachers with higher levels of skill training and experience specific to early childhood education were more likely to practice the beliefs associated with their early childhood training (i.e., DAP). Teachers who received training specific to elementary education tended to be more likely to use teacher directed instruction that is considered DIP.

In another study by Maxwell, McWilliam, Hemmeter, Ault, and Schuster (2001) that looked at predictors of developmentally appropriate or inappropriate practices in a classroom, classroom characteristics, teacher characteristics, and teacher beliefs were considered. The results showed that teacher education levels, teacher beliefs, and the grade levels, kindergarten through third grades, were the greatest predictors of DAP. The education levels only considered whether they had bachelor's or masters' degrees and did not take into consideration the certifications of elementary or early childhood. Class size and years of experience of the teacher showed little significance.

Additionally, according to a review of literature by Daniels and Shumow (2003), it is not uncommon for many teachers to believe that students' innate abilities and/or environment control their ability to learn and increase their skill levels. Many of these beliefs were formed through their teacher preparation programs and training. They are, in turn, shared in classrooms as cooperating teachers model teaching practices and impart philosophies for their student teachers.

A significant amount of research supports the impact that child development plays in a child's cognitive development (NCATE, 2010), especially in the areas of physiology, endocrinology, and brain development, but little evidence indicates that this knowledge plays a significant role in instructional decisions made by the teacher, especially concerning DAP. Perhaps this is most directly a result of the fact that this research has not become a focus or requirement for teacher preparation and certification programs.

Linking DAP and Teacher Training

Teacher training in DAP for instruction is also closely aligned to the historical support of assessment through observation. The practice of assessing a young child's learning can be traced back to the Child Study Movement begun by Stanley Hall in the

mid-1800s. He was later supported by others, such as Dewey, Vygotsky, and Piaget, in using observation of children to understand more about their learning (Reifel, 2011).

Although a paucity of research clearly defines what the knowledge, training, and experience of a quality, pre-school teacher should be, some experts propose specific standards. Kostelnik and Grady (2009) provided explicit criteria for this education and training. "Teachers and staff have specific training in child development, early childhood education, and relevant subject matter content such as literacy, mathematics, science, social studies, physical education, and the arts" (p. 23). After a review of research, Whitebook (2003) concurred and concluded that "the presence of BA-level teachers with specialized training in early childhood education leads to better outcomes for young children" (p. 2).

Additionally, NAEYC's work also informed the re-authorization of the Higher Education Opportunity Act (Robinson, 2007). Their goal was to influence teacher preparation and professional development. One of the provisions in the Higher Education Opportunity Act of 2008 was to award competitive grants to states to establish State Early Childhood Education Professional Development and Career Task Forces (Council for Exceptional Children, 2008). Among other activities, these task forces were to review early childhood teacher training and professional development opportunities; however, no new requirements identified or affected highly qualified teachers in early education programs.

The National Association of Early Childhood Teacher Educators (NAECTE) released a position statement that supported the importance of early childhood certification (Feeney, 2009). This was prompted by the concern that too many teachers

with general elementary certifications were being hired to teach early childhood classes. Schools considered the flexibility of a teacher's certification for placement within the system, rather than what the specific training of the teacher meant to the education of the student. Possible reasons for these decisions may have derived from a lack of understanding of the difference of early childhood and elementary education, and fiscal issues that necessitate flexibility among teacher levels.

That flexibility caused additional issues for students in early childhood grades. This was especially true with mandated testing and pressure for schools to ensure students are proficient on such assessments as required by NCLB (NCLB, 2001). Superintendents or principals felt compelled to place the most effective teachers in the grades that were tested. Because NCLB requires accountability beginning in third grade, teachers identified as less effective may be assigned to the earlier grades of kindergarten, first, and second (Bornfreund, 2012).

Consider the irony in these decisions for those who do not understand the importance of proper foundational skills for both reading and math; students cannot build upon skills in the upper grades that they never mastered in the lower grades. Brain research supports the critical need to develop language learning in young children in order for students to experience future success; therefore, there could be a strong argument to have the most highly effective teachers in the early childhood classrooms (Dubinsky, 2010).

The experience of the teacher is critical in making appropriate connections between young children's social interactions and their learning. The lack of experience on the teacher's part to understand and implement appropriate connections between a

child's behavior and academics can negatively affect the child's learning outcomes (Duncan et al., 2007). The experienced teacher is able to provide developmentally appropriate interventions that will promote learning, rather than prevent learning. The question remains: Where does the teacher get the experience, pre-service or in-service?

This also connects to the relationship between the child and the teacher. Not only is experience an important factor in the development of this relationship, but Palermo, Hanish, Martin, Fabes, and Reiser (2007) suggested that the teacher's training that leads to an understanding of the importance of a positive child-teacher relationship is critical to improving the students' readiness to be successful in kindergarten. This training may include pre-service and in-service education, with additional support for educators through observations and feedback from well-trained supervisors.

In a study conducted by NCATE (2010), three gaps were identified between what effective educators need to be successful in classrooms and what teacher preparation programs offer. These gaps include insufficient coursework in child or adolescent development, lack of connection between theory and the classroom, and little consistency between coursework, classroom practice, and supervision. According to Watson, Leibbrand, and NCATE (2010) these gaps need to be bridged as educators understand, connect, and practice specific domains of development, regardless of the child's age. These include physical, cognitive, linguistic, social, psychological, and ethical domains (p.3). Both educational preparation practices and policies need to address these issues if students are going to learn at rigorous levels.

NAECTE's position on the qualifications of teachers in early childhood classrooms included the following requirements: state funded Pre-K and kindergarten

programs must hire teachers with early childhood certifications; teachers with early childhood certification must be given preference in hiring for first, second, and third grades in public schools; and teacher certification programs must align their standards with those consistent with NAEYC's standards (NAECTE, 2009). Highly qualified status (as required by NCLB) for teachers of Pre-K through grade three should only be given to teachers with an early childhood certification. While NAEYC (2014) continued to support states reviewing their certification programs to ensure that early childhood programs aligned to the voluntary national standards proposed by NAEYC, to date there has been nothing linked to the highly-qualified status of teachers in the early childhood grades.

The National Institute of Child Health and Human Development (2007) issued a report in conjunction with the NCATE that made recommendations for teacher preparation programs that would positively impact student learning by incorporating research on child and adolescent development. Among the recommendations was the importance of application. While a child or adolescent development class is required in the majority of teacher preparation programs, they are most often taught through the psychology department, totally disconnected to the education department. Simply learning about child or adolescent development in a required course, and assuming it will transfer into the classroom with children is not enough. Rather, it must be applied through intentional connections and applications. The report suggested that these connections and applications should be provided in stages. Initially, case studies may be introduced with practical, hands-on experience added as the developmental research knowledge base is expanded.

H.R.791 - Continuum of Learning Act of 2013 113th Congress (2013) was introduced in the House of Representatives as an amendment to the Elementary and Secondary Education Act (ESEA). H.R. 791 required local educational agencies, to the greatest extent possible, to place teachers in the early grades who were trained in early child development. States were also required to incorporate knowledge about early childhood development into teacher and principal preparation programs. In addition, professional development should be provided for both early childhood and elementary teachers that focuses on the knowledge and understanding of child development and learning (NAEYC, 2014). While it never moved past the House, it influenced states' focus on early childhood programs.

Unfortunately, too many teacher preparation programs provide an either/or structure. Their certifications are often kindergarten through fifth, or sixth grades, and emphasize either a deep understanding of child development, or expertise in specific subject areas (Bornfreund, 2012). Additionally, Bornfreund (2012) pointed out that information focused on human development is presented as general knowledge, and is not connected to instruction. They are not linked to any practical experience.

One of the challenges that exists for many accredited, higher education institutions is finding faculty members with the expertise in child development and appropriate practices. Faculty members are often adjunct instructors who only teach one or two courses and rarely meet with other members of the education department. This creates an issue of inconsistency among the curriculum and program delivery when they lack the expertise to incorporate developmentally appropriate research leading to developmentally appropriate classroom practices (NCATE, 2010).

The same challenge occurs in trying to link teacher candidates with cooperating teachers who not only have the knowledge of DAP, but evidence of its use in the classroom. Rigorous standards may be in place for teacher preparation programs and required for licensures, but many teachers lack the practical skills and application to model appropriate instructional practices in their classrooms (Pianta, Belsky, Houts, & Morrison, 2007). These experienced teachers may be master teachers in curriculum or instructional delivery; however, they may not model or emphasize the importance of consideration of the development of the child.

Pennsylvania enacted new guidelines for teacher certification and designated a PreK-4 certification that required specific concentration on PreK-4 principles. *The Framework for Grades Pre K-4 Program Guidelines* (2009) included a focus on the following principles: all children regardless of ability to learn; curriculum based on developmentally appropriate practices and the Pennsylvania Early Learning Standards and Academic Standards for grades 3 and 4; teacher preparation programs must use the child development frame of reference; connection to the importance of families in the educational process; and an understanding and appreciation of diverse populations.

These guidelines also included a focus on producing evidence. This evidence must include ways the institution will prove that the graduates have mastered the skills and knowledge needed to implement effective teaching. They must also verify that those instructors who are teaching in the certification program have expertise for both the content they are instructing and effective pedagogy to deliver the content.

Pennsylvania took steps to identify the levels of specialized training that will most closely predict positive outcomes in early childhood programs. The Pennsylvania Keys to

Quality Early Learning Career Lattice was developed for the early care and education fields to define the educational levels required for different positions within the field (Pennsylvania Early Learning, 2009). The Career Lattice provides practitioners with an instrument that defines choices in moving forward in their careers by identifying specific credentials and degrees that will lead to a better understanding of developmentally appropriate practices for the young child.

The career lattice is supported by the research on the increased child outcomes, when teachers have professional development specific to understanding concepts of early learning, such as childhood development and family communication. Forty years of research has linked the competency of teachers to high quality, early education programs (Pennsylvania Early Learning Keys to Quality, 2012). The National Institute for Early Research lists teacher certification in its Pre-K quality standards checklist when analyzing the quality of a state's early childhood program (Barnett, Hustedt, Robin, & Schulman, 2005). According to the Office of Child Care's National Child Care Information and Technical Assistance Center (2010), 30 states have adopted a form of a career lattice that outlines the training requirements for early childhood educators. The state of Washington issued a significant report to the legislature in support of creating a similar career matrix as Pennsylvania (Professional Development Consortium [PDC], 2010). In other words, there is strong support that teachers' knowledge and training significantly impact children's learning.

Recently, Pennsylvania implemented certification changes for elementary teachers in 2013 (Pennsylvania State Education Association [PSEA], 2013). One of the revisions occurred in the elementary certification of grades K-6. Elementary

certifications are granted at two levels to reflect the early childhood focus: grades PreK-4 and grades 4-8 with a concentration area. While not required by the Elementary and Secondary Education Act (ESEA), the change supports the recognition that there is a difference between early childhood education and middle elementary grades. At the Delaware Valley Association for the Education of Young Children (DVAEYC) Annual Conference in Philadelphia, Pennsylvania, in March, 2015, Governor Wolf expressed his commitment to an investment in early education through stronger licensing and certification requirements, with additional support for career training of those that are currently working in early childhood programs (PA.Gov, 2015).

One of the difficulties in researching the impact that teacher quality has on child outcomes in educational settings for young children stems from the necessity to discern the difference among teacher characteristics and other variables in the classroom (i.e., the curriculum, length of the day, and student demographics). In a research study by Pat Scheffler (2009), interactions between student demographics of age, gender, ethnicity, primary language, etc., were studied to determine their impact on child outcomes. Her findings revealed, outside of age, the greatest factor in determining the outcomes was the teacher. Considering the review of literature of DAP, teacher beliefs, and early childhood teacher training, there are implications for early childhood teacher certifications. Further research is necessary to determine if the early childhood teachers' training affects child outcomes.

Chapter 3
Methodology

Sample

The sampling frame for the current investigation included classrooms comprised of students in a 3- and 4-year-old federally and state funded program in Mercer County in Pennsylvania. Mercer County is located in northwestern Pennsylvania and spans approximately 673 square miles and borders Ohio. Its population is approximately 115,000 people with a racial composition of 92% white and 6% Black or African American. The median household income is about $44,000. All participating children qualified for the program through the Federal poverty guidelines.

The data were gathered over the 2013-2014 and 2014-2015 school years, and represent 55 classrooms in the county and 33 different teachers. All classroom teachers use a common curriculum and assessment. The overall results of the students' assessment were compared to specific areas of the teacher's training: college degree, certification, years of experience in the county early childhood program, issuing higher education institution of degree, or issuing state of certification. An analysis of the data determined if teachers' specific training areas is related to student outcomes.

Instrumentation

Teaching Strategies GOLD Assessment tool was used to measure classroom results. The GOLD assessment is an observation-based assessment that measures10 areas; however, only the six research-based categories were reported in this study. These categories included social-emotional, physical, language, cognitive, literacy, and

mathematics. The assessment measures child growth and development and predicts school readiness. Ongoing, authentic assessment, using performance assessment tasks, measure results for children from birth through kindergarten (Teaching Strategies, 2010). Reliability and validity for the assessment were conducted through a sample size of 18,000 children that represented all 50 states and included 3,000 children for each of the age level categories: birth to 1, 1 to 2, 2 to 3, 3 or preschool, 4 or prekindergarten, and kindergarten (Teaching Strategies, 2013).

The authentic assessment was conducted through observation of children in the context of their own classroom over time. Teachers were able to document what a child knows and is able to do by collecting artifacts that represent targeted objectives. These artifacts may include a photo of a child demonstrating a skill, a piece of work that was completed by a child, or a sticky note that quotes something a child said or did. They were saved in a portfolio that provided ongoing documentation of the child's learning. (Heroman et al., 2010). In order to determine the child's progress, the teacher used the collected artifacts to evaluate the child's skills and behaviors as compared to "research-based indicators of learning and development" (Heroman et.al, 2010, p. viii) for children birth through kindergarten in each of the ten areas.

Teachers received inter-rater reliability certification through an online process that provided multiple opportunities for teachers-in-training to rate artifacts of knowledge, skills, and behaviors of children in three different age groups: birth through 2 years of age; 3 years of age through kindergarten, or mixed ages. These artifacts were included in portfolios that were gathered in early childhood classes of children that did not have excessive absences. The teacher-in-training must have had a minimum of 80%

agreement with Teaching Strategies GOLD Assessment developers that are considered "master raters." Ratings must have been within the master rater's range of ±1 (Teaching Strategies, Inc., 2011).

Concurrent validity studies were conducted in both Tulsa, Oklahoma pre-school classes and Washington state kindergartens. The results showed moderate to high correlations in the Tulsa study, and moderate correlations in the Washington study (Teaching Strategies, LLC., 2013). A full description of the Teaching Strategies GOLD is available at https://teachingstrategies.com/content/pageDocs/GOLD-Touring-Guide_5-2013.pdf

A quantitative study was conducted to determine if an association exists between the teacher's specific training and student outcomes. The independent variables were the teacher's college degree, certification, years of experience in the county early childhood program, issuing higher education institution of degree, and issuing state of certification. The dependent variable was the classroom student assessment outcomes. These outcomes were broken into six areas of development and reported as class averages.

Method

The goal of this study is to investigate whether a relationship exists between specific areas of the teacher's training and student outcomes. These areas include: college degree, certification, years of experience in the county early childhood program, issuing higher education institution of degree, and issuing state of certification.

In order to examine whether relationships exist, students' levels on the Teaching Strategies GOLD Assessment tool were gathered from the 2013/2014 and 2014/2015 school years. Averages were recorded for each classroom representing six categories that include the following: social-emotional, physical, language, cognitive, literacy, and

mathematics. The collected results were from the final assessment of the school year. Because the results are symbolic representations of levels, they were translated in ordinal numeric data to allow for analysis. Each teacher was assigned a unique number to identify him/her, and he/she was assigned to students in his/her classroom. A level for each training variable was assigned to each teacher. Theses training variables were translated into ordinal numeric data for analysis.

Data Analysis

In order to address the hypothesis that there is a relationship between teachers that have more experience, or an early childhood degree and child outcomes, and there is not a relationship between the degree, issuing state of degree, or issuing higher education institution of the degree and child outcomes, a correlational analysis was conducted in order to assess the association between the independent and dependent variables. Correlational tests, including Spearman's rho, were used to determine the extent to which a relationship exists between the teacher's college degree, certification, years of experience in the county early childhood program, issuing higher education institution of degree, and issuing state of certification and student outcomes.

Limitations

Limitations of this study include the transiency of students in the early childhood program that will affect whether they are assessed three times during the school year. This is a causal-comparative research study, and, thus, will be subject to validity threats associated with causal-comparative designs.

Delimitations

Delimitations of this study include the analysis of only one early childhood program in order to analyze a common assessment. The results can be generalized to other similar programs in the same region of Pennsylvania.

Chapter 4
Data Analysis

The current investigation sought to examine differences in early childhood teachers, specifically, their training. These differences in their training included degree, certification, years of experience in the county early childhood program, higher education institute issuing the degree, and the state issuing the certification. Furthermore, it sought to determine if there was a relationship between the differences in training and child outcomes in the county early childhood program.

The data for the research were gathered from the county early childhood program from two consecutive years. The teacher data were organized by classrooms with no teacher identification given, only their specific training information. The child outcome data from the GOLD assessment were provided by classrooms with averages for both three- and four-year-old students reported separately. The average scores were reported for the following developmental areas: social-emotional, physical, language, cognitive, literacy, and mathematics. There were 33 unique teachers represented in the two years of data, and 749 children represented in the three- and four-year-old classroom data averages.

The teacher data were organized into an Excel spreadsheet and reported by each of the training categories of degree, certification, years of experience in the county early childhood program, institute issuing the degree, and the state issuing the certification, as well as the number and age of students in each classroom. The student data from the GOLD assessment were also recorded for each teacher's classroom. The data entered included class averages for starting and ending scores, average score, type of growth (met

or not met) and the quartile of growth for each developmental category. These developmental categories included social-emotional, physical, language, cognitive, literacy, and mathematics.

Descriptive Statistics

The classroom breakdown by academic year is presented in Table 1.

Table 1. *Academic Years*

Year	Frequency	Percent
2013-2014	51	47.7
2014-2015	56	52.3

Because the data were reported separately for students who were three- and four-years-old for each class, there were actually 27 classrooms in 2013-2014 and 28 classrooms in 2014-2015. Notably, there were five more data sets represented for 2014-2015 than for the previous year. The data set included a total of 33 different teachers, who had an average of M =6.71 (SD = 6.17) years in the program. Table 2 presents the breakdown of years of experience by clusters. These clusters were created due to the vast variance of years of experience from .25 years to 24 years.

Table 2. *Years of Experience in Program*

Years of Experience in Program	Number of Teachers	Percent
0-4	50	47%
5-10	34	32%
11-15	14	13%
16-above	9	8%

As displayed above, the greatest number of teachers represented was from 0-4 years and the least number was 16-above. Table 3 presents the breakdown of degree level.

Table 3. *Degree Level*

Degree Level	Frequency	Percent
BA	12	11.2
BS	87	81.3
BS/MS	8	7.5

As indicated in Table 3, most teachers earned a bachelor of science degree. Because the bachelor of arts degree provides a broader education, with fewer courses focused on the major than the bachelor of science degree, it is significant to know if either of the foci of these degrees provides greater child outcomes. Table 4 provides a breakdown of teacher certifications across the different classes.

Table 4. *Teacher Certifications*

Teacher Certification	Frequency	Percent
ECE	48	44.9
ECE/Elem	16	15
ECE/Elem/MS ECE	4	3.7
ECE/Elem/MS_ED	8	7.5
ECE/SPED	8	7.5
Elem +30 ECE	6	5.6
Elem + 35 ECE	4	3.7
Elem + 36 ECE	4	3.7
Elem + 39 ECE	1	0.9
Elem + 42 ECE	4	3.7
Elem + 56 ECE	4	3.7

As indicated above, most teachers had an Early Childhood Education (ECE) certification followed by the dual certification of Early Childhood Education and Elementary Education (Elem). Next, the data were examined by the state of the degree-granting institution. Results indicated that $n = 25$ (76%) teachers received their degree in PA; $n = 5$ (15%) teachers received their degree in OH; $n = 1$ (3%) teachers received their degree in NY; $n = 1$ (3%) teachers received their degree in UT.

A total of 15 institutions was represented. The distribution of these institutions is presented in Appendix A. Table 5 presents the student make-up of each class.

Table 5. *Class Make-up*

Class Make-Up	Age of Children	# of children
Mean	3.5	7
Std. Deviation	0.502	3.162
Skewness	-0.019	0.171
Kurtosis	-2.038	-0.813

As indicated above, the age of children and the number of children represented a normal distribution, with skewness and kurtosis within acceptable levels (|2.0| and |5.0| respectively (Field, 2009). Further analysis revealed that the average number of three year olds in a class was $M = 5.00$ ($SD = 2.31$) and the average number of four year olds was $M = 8.96$ ($SD = 2.813$).

Starting scores, ending scores, and average growth scores were provided for each class or students. Table 6 presents the descriptive data for average starting scores.

Table 6. *Starting Scores*

	SE	PHY	LNG	COG	LIT	MATH	Overall
Mean	38.666	25.846	36.793	39.888	29.074	21.863	32.046
Std. Deviation	7.304	4.071	6.362	7.073	10.291	6.672	6.289
Skewness	-0.028	-0.051	-0.004	0.130	0.229	-0.266	0.099
Kurtosis	-0.341	0.673	-0.349	0.868	-0.299	-0.318	-0.442

As shown above, the average cognitive scores were the highest (M=39.888, SD=7.073), while the mathematics starting scores were the lowest (M=21.863, SD=6.672). As indicated above, the starting scores represented a normal distribution, with skewness and kurtosis within acceptable levels (|2.0| and |5.0| respectively (Field, 2009). Table 7 provides the descriptive data for average ending scores.

Table 7. *Ending Scores*

	SE	PHY	LNG	COG	LIT	MATH	Overall
Mean	52.636	32.368	48.379	54.866	50.899	34.642	45.652
Std. Deviation	8.104	3.909	6.889	8.935	14.440	7.901	7.832
Skewness	-0.158	-0.578	-0.151	0.159	0.280	-0.054	0.043
Kurtosis	-0.428	0.435	-0.328	-0.379	-0.485	-0.122	-0.347

As indicated above, the average cognitive scores were the highest (M=54.866, SD=8.935), while the mathematics ending scores were the lowest (M=34.642, SD=7.901). Also, the ending scores represented a normal distribution, with skewness and kurtosis within acceptable levels (|2.0| and |5.0| respectively (Field, 2009). Table 8 provides the descriptive data for average growth.

Table 8. *Average Growth*

	SE	PHY	LNG	COG	LIT	MATH	Overall
Mean	13.950	6.521	11.587	14.978	21.846	13.019	13.645
Std. Deviation	5.582	3.129	4.809	6.381	8.930	4.858	4.926
Skewness	-0.131	-0.452	0.369	0.696	0.809	0.513	0.619
Kurtosis	2.128	1.693	1.164	0.990	1.321	0.299	0.825

As displayed above, the average growth was the highest in LIT (M=21.846, SD=8.930), while the PHY growth was the lowest (M=6.521, SD=3.129). Also noted above, the ending scores represented a normal distribution, with skewness and kurtosis within acceptable levels (|2.0| and |5.0| respectively (Field, 2009). Table 9 provides the descriptive data for type of growth.

Table 9. *Type of Growth*

Area of Development		Frequency	Percent
SE			
	Not Met	3	2.8
	Met	104	97.2
PHY			
	Not Met	5	4.7
	Met	102	95.3
LNG			
	Not Met	4	3.7
	Met	103	96.3
COG			
	Not Met	6	5.6
	Met	101	94.4
LIT			
	Not Met	6	5.6
	Met	101	94.4
MATH			
	Not Met	3	2.8
	Met	102	95.3

While the expectation of growth varied for each area of development, overall, approximately 95% of all students met the expected growth range with SE revealing the highest average growth met, and COG and LIT representing the lowest average growth met. Table 10 provides the frequency of growth by quartiles.

Table 10. *Growth by Quartiles*

Area		Frequency	Percent
SE			
	0-24	3	2.8
	25-49	65	60.7
	50-74	32	29.9
	75-100	7	6.5
PHY			
	0	1	0.9
	0-24	5	4.7
	25-49	53	49.5
	50-74	44	41.1
	75-100	4	3.7
LNG			
	0-24	4	3.7
	25-49	51	47.7
	50-74	44	41.1
	75-100	8	7.5
COG			
	0-24	6	5.6
	25-49	51	47.7
	50-74	41	38.3
	75-100	9	8.4
LIT			
	0-24	6	5.6
	25-49	40	37.4
	50-74	50	46.7
	75-100	11	10.3
MATH			
	0-24	3	2.8
	25-49	43	40.2
	50-74	44	41.1
	75-100	15	14

As expected, the largest frequency of data was found in the inter-quartile range (between 25^{th} -75^{th} percentile). An interesting find was that math showed the greatest growth, which likely reflects this being the lowest area of starting score.

Preliminary Analysis

Table 11 presents the results of a One-Sample Kolmogorov-Smirnov Test across all average growth outcome areas. This test examines the assumption of normality of the distribution of the data.

Table 11. *One-Sample Kolmogorov-Smirnov Test*

	SE	PHY	LNG	COG	LIT	MATH	Overall
Test Statistic	0.108	0.080	0.066	0.091	0.077	0.057	0.074
Sig.	0.004	0.088	0.200	0.031	0.130	0.200	0.192

As indicated above, two areas of development presented significant outcomes for the One-Sample Kolmogorov-Smirnov Test. These significant results were not of concern since all levels of skewness and kurtosis were within acceptable ranges. Next, the test of homogeneity of variance was evaluated to examine if the distribution of the data is statistically different. If differences in the shape of the distributions exist, the degrees of freedom for the analytical computations are adjusted downward in order to correct for the differences. Table 12 provides results from the Kruskal-Wallis Test of homogeneity of variance.

Table 12. *Kruskal-Wallis Test*

		SE	PHY	LNG	COG	LIT	MATH	Overall
Degree Level	χ^2	0.795	3.206	3.577	0.361	0.387	3.393	1.109
	Sig.	0.672	0.201	0.167	0.835	0.824	0.183	0.574
Certification	χ^2	23.789	27.259	39.094	22.450	15.945	23.941	25.643
	Sig.	0.008	0.002	0.000	0.013	0.101	0.008	0.004
State of Inst	χ^2	9.469	5.995	7.606	14.433	8.616	13.915	11.634
	Sig.	0.092	0.307	0.179	0.013	0.125	0.016	0.040

As specified above, homogeneity of variance was tenable across all outcome variables for degree level and the state of the institution, with the exception of COG and

MATH. However, homogeneity of variance results did not support this assumption based on the Kruskal-Wallis Test for all the outcome developmental areas, with the exception of LIT, when examining area of certification. This was not a concern according to Tabachnik and Fidell (2013) because of the sample size and the use of aggregate data.

Table 13 presents a zero-correlation analysis between areas of development and years in program.

Table 13. *Area of Development by Years in Program*

Correlations	Years in Program
SE	.379**
PHY	.306**
LNG	.407**
COG	.311**
LIT	.383**
MATH	.306**
Overall	.403**

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

As shown above, years in program were significantly correlated to all areas of development at a moderately positive level (Field, 2009).

Table 14 presents zero-order correlational analysis between all areas of development.

Table 14. *Zero-Order Correlation between Areas of Development*

	SE	PHY	LNG	COG	LIT	MATH	Overall
SE	1	.700**	.836**	.773**	.675**	.676**	.880**
PHY		1	.677**	.595**	.608**	.590**	.757**
LNG			1	.789**	.666**	.670**	.873**
COG				1	.798**	.751**	.917**
LIT					1	.792**	.904**
MATH						1	.864**

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

As shown above, all areas of development were highly correlated with the other areas of development, $p<.01$. The greatest relationship was found between SE and LNG followed by COG and LIT. The weakest relationship, yet, still strong relationship, was found between PHY and MATH.

A Box's M test of equality of covariance matrices analysis was also conducted because of the high correlations found across the outcome variables. The Box's M test results, $F(63, 1850) = 1.668$, $p=.001$, indicated that the assumption of homogeneity of covariance matrices is not tenable, however, Tabachnik and Fidell (2013) indicated that when the error degree of freedom is greater than 20 that this assumption is presumed satisfied.

Multivariate and Analysis of Variance

Based on the aforementioned test of statistical assumptions, a multivariate analysis of variance (MANOVA) was deemed most appropriate to answer the stated research questions regarding degree area, certification, the state of the institution, and years of experience in the program. MANOVA is an analysis where highly correlated outcome variables can be examined both simultaneously and independently, across different independent variables. This is beneficial because the simultaneous examination allows for reducing potential bias by eliminating overlapping variance in the highly correlated dependent variables (Field, 2009; Tabachnik & Fidell, 2013).

In an effort to run this analysis appropriately, certification of elementary with additional early childhood credit hours were clustered into one fixed-factor. As previously mentioned, years of experience in the program was clustered into four levels: 0-4 years, 5-10 years, 11- 15 years, and 16 and above.

The multivariate analysis, based on the Hotelling's Trace results, indicated that average growth across degree level, certification, and years of experience were significant. These results are presented in Table 15.

Table 15. *Multivariate Test*

Multivariate	F	df	Error df	Sig.	Partial η^2
Degree	2.923	6	80	0.012	0.180
Certification	2.078	24	314	0.003	0.137
State of cert	1.236	6	80	0.297	0.085
Years	3.507	18	236	0.000	0.211

As indicated above, the state of certification did not reveal significant results. The sample size did not support any interaction analysis.

Table 16 presents the results of the between-subject analysis.

Table 16. *Test of Between-Subject Analysis*

Source	Variable	F	df	Sig.	Partial η^2
Degree Level	SE	0.494	1	0.484	0.006
	PHY	1.004	1	0.319	0.012
	LNG	8.264	1	**0.005**	0.089
	COG	0.333	1	0.565	0.004
	LIT	1.388	1	0.242	0.016
	MATH	0.152	1	0.698	0.002
Certification	SE	1.194	4	0.319	0.053
	PHY	4.329	4	**0.003**	0.169
	LNG	2.853	4	**0.029**	0.118
	COG	0.785	4	0.538	0.036
	LIT	1.677	4	0.163	0.073
	MATH	2.053	4	0.094	0.088
State	SE	0.001	1	0.977	0.000
	PHY	0.074	1	0.787	0.001
	LNG	0.26	1	0.611	0.003
	COG	3.216	1	0.076	0.036
	LIT	1.975	1	0.164	0.023
	MATH	1.904	1	0.171	0.022
Years	SE	12.404	3	**0.000**	0.304
	PHY	4.9	3	**0.003**	0.147
	LNG	7.746	3	**0.000**	0.215
	COG	10.849	3	**0.000**	0.277
	LIT	6.964	3	**0.000**	0.197
	MATH	2.635	3	0.055	0.085

As indicated above, between subject analysis identified LNG as significant across degree levels. Additionally, PHY and LNG were significant for certification area. Years in the program presented significant results in all developmental areas; however, math was marginal. Table 17 shows certifications by average growth of developmental areas.

Table 17. *Certifications by Average Growth of Developmental Areas*

Certification	SE	PHY	LNG	COG	LIT	MATH	Overall
ECE	14.454	7.125	11.96	15.254	22.600	14.019	14.2354
ECE/Elem	17.138	6.706	15.369	18.831	25.862	15.627	16.5463
ECE/Elem/MS ECE	13.425	7.475	10.625	17.800	19.800	11.675	13.4667
ECE/Elem/MS_ED	13.725	4.375	9.838	13.375	20.638	9.7750	11.9542
ECE/SPED	12.000	6.175	8.888	11.488	17.787	10.888	11.2042
Elem + ECE Credit	11.526	5.830	9.891	13.000	19.665	11.259	11.8607

As shown above, the two certification areas that showed the greatest overall growth were ECE and the dual certification of ECE/Elem. LNG showed the greatest difference in between ECE and ECE/Elem with ECE/Elem being the greatest growth.

Figure 1 provides a graphic representation of the certifications by average growth of areas of development.

Figure 1. Certifications by Average Growth of Areas of Development

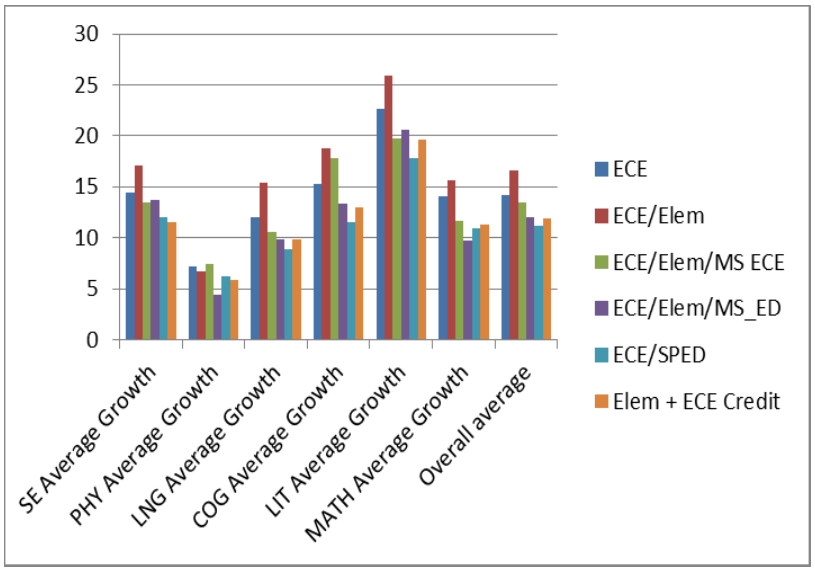


Table 18 presents the mean score of the six developmental areas years of experience in the program.

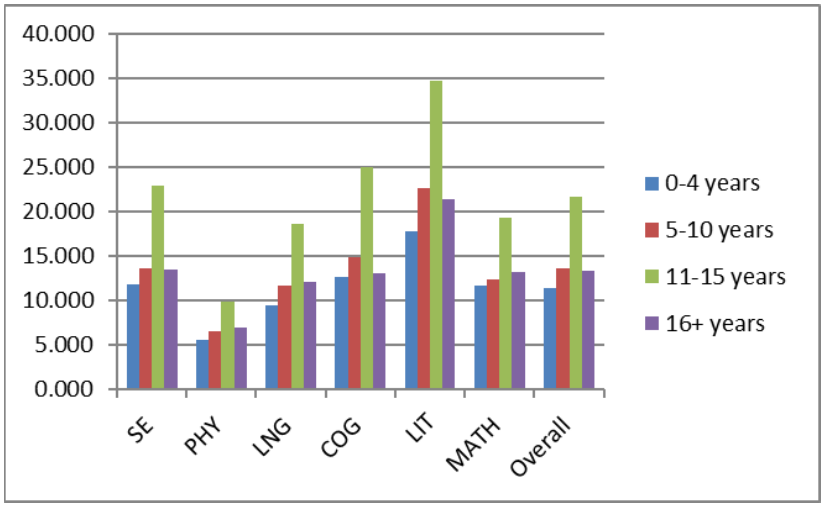
Table 18. *Mean Developmental Area Growth Score by Years of Experience*

	0-4 years	5-10 years	11-15 years	16+ years
SE	11.748	13.624	22.900	13.489
PHY	5.478	6.579	9.857	6.900
LNG	9.456	11.679	18.657	12.078
COG	12.576	14.900	25.000	13.022
LIT	17.800	22.609	34.736	21.389
MATH	11.624	12.385	19.271	13.211
Overall	11.447	13.623	21.737	13.348

Additionally, as seen above, the greatest growth for all developmental categories was for teachers with 11-15 years of experience in the program.

Figure 2 provides a graphic representation of the developmental growth by years of experience.

Figure 2. Mean Developmental Area Score by Years of Experience



Further investigation looked at the number of Years of Experience across reported Certification. A Pearson's Chi-Square analysis reveals that there was a significant association between years of experience in the program and the represented certification areas, $\chi^2(15) = 86.81$, $p<.001$. The breakout of this data is presented in Table 19.

Table 19. *Years of Experience in the Program Across Certifications*

	Years of Experience in Program				Total
Certification	0-4	5-10	11-15	16+	
ECE	32	10	6	0	48
ECE/Elem	2	2	8	4	16
ECE/Elem/MS ECE	4	0	0	0	4
ECE/Elem/MS_ED	0	8	0	0	8
ECE/SPED	8	0	0	0	8
Elem + ECE Credit	4	14	0	5	23
Total	50	34	14	9	107

As indicated in Table 19, all participants with 11-15 years of experience were associated with the ECE and ECE/Elem certifications. Additionally, Table 19 reveals that all ECE/Elem/MS ECE and ECE/Elem/MS_ED certified teachers were associated with the 0-4 and 5-10 years of experience in the program.

An ANOVA was conducted on institution because of the 15 different institutions reported. The results of the ANOVA analysis are represented in Table 20.

Table 20. *ANOVA Analysis*

Area of Development		F	df	Sig.
SE	Between Groups	0.888	14	0.574
	Within Groups		92	
PHY	Between Groups	2.046	14	0.022
	Within Groups		92	
LNG	Between Groups	0.943	14	0.517
	Within Groups		92	
COG	Between Groups	1.234	14	0.265
	Within Groups		92	
LIT	Between Groups	0.784	14	0.684
	Within Groups		92	
MATH	Between Groups	1.728	14	0.064
	Within Groups		90	

As indicated above, none of the areas of development presented significant results, with the exception of PHY. However, careful examination of Scheffe post-hoc

analysis indicated no statistical significance across any reported institution on PHY. This anomaly was likely an artifact of the small number of participants identified as attending Western Governor's University, which, subsequently, presented the highest PHY average growth.

Summary

Chapter 4 compares the relationship between teacher specific data and the student results on the GOLD assessment given to three- and four-year-old children in a county early childhood program. There were 33 different teachers represented in the data, and there was assessment data from 749 children. The data collected for the teacher training categories included degrees, certification, years of experience in the county early childhood program, institute issuing the degree, and the state issuing the certification. More specifically, the data represented the following: two types of degrees- bachelor of science and bachelor of arts; five types of certifications- early childhood, dual certification of early childhood and elementary, dual certification of early childhood and elementary and a master's degree in early childhood, dual certification of early childhood and elementary and a master's degree in education, dual certification of early childhood and special education, and elementary certification with additional credits in early childhood education; years of experience in the program ranging from .25 years to 24 years; 15 institutions issuing degrees; and 4 states issuing the certification.

Student assessment data were reported that included class averages for starting, ending, and growth results, the type of expected growth (met or not met), and the quartile of the growth. Each of these data were reported in the six developmental categories of social-emotional, physical, language, cognitive, literacy, and mathematics.

Not surprisingly, the zero-order correlational analysis between all areas of development revealed significant correlation to years in program at a moderately positive level. Additionally, all areas of development were highly correlated with the other areas of development, with the greatest relationship found between social-emotional and language followed by cognition and literacy. The 11-15 years of experience cluster showed the greatest mean growth across every developmental area.

A multivariate analysis of variance test presented significant results for average student growth across degree level, certification, and years of experience. More specifically, language showed the greatest significance for degree level; physical and language were most significant for certification areas, and more specifically, ECE and ECE/Elem certifications; and years in the program was significant, as previously revealed for all developmental areas; however, math was the lowest. The state of issuing certification revealed no significance.

Finally, ANOVA was conducted to determine the relationship between the areas of development and the institution issuing the certification, but there were no significant results discovered.

Chapter 5

Discussion of Analyses

Research has shown that early childhood education has made a significant impact on children's success during their formal schooling and later in life. Three important studies that focused on early childhood education provided support for these benefits to both children and society. These studies included: Abecdarian Project (Ramey, Pungello, Sparling, & Miller-Johnson, 2002); HighScope Perry Preschool Study (Schweinhart, et al., 2005), and the Chicago Child-Parent Centers, a pre-school program (Reynolds, Temple, Robertson, & Mann, 2002). Among the short-term benefits, children were less likely to be identified as needing remedial or special education services. As adults, those who attended early childhood program saw long-term benefits that included higher rates of home ownership, earned income, employment, and savings, as well as lower rates of dependence upon welfare and less likely to be involved in the judicial system. Additionally, society benefits when there is greater revenue collected from higher earned salaries, as well as less money invested in the judicial system (Kostelnik & Grady, 2009; Shonkoff, 2000; Ramey, Pungello, Sparling, & Miller-Johnson, 2002).

While the research supports early childhood education, it also makes it clear that it must be high quality. Even though "high quality" hasn't been definitively identified, there is evidence that one of the most important factors in increasing student achievement, or creating a quality education, is the teacher (Darling-Hammond, 2006). This leads to the next question: What determines a quality teacher?

The purpose of this study was to investigate differences in early childhood teachers, and, specifically, their training. This study explored whether there is a relationship between the training and experience of early childhood teachers and student outcomes. The null hypothesis examined in this investigation was that no relationship exists between some areas of the teacher's training and child outcomes. Also, there is not a relationship between the degree, state issuance of degree, or higher education institution issuance of the degree and child outcomes.

In order to investigate whether there is a relationship between the teacher variables and child outcomes, data were gathered from a county early childhood program over two school years, 2013-14 and 2015-16. The child data were collected from the Teaching Strategies GOLD assessment. There were 107 assessment results reported. Separate results were reported for 3- and 4-year-old students that were gathered from 55 classrooms. The teacher training variables represented were collected from a total of 33 teachers. These specific areas of the teacher's training included: college degree, certification, years of experience in the county early childhood program, issuing higher education institution of degree, or issuing state of certification.

College Degree

In an effort to understand the impact of teacher training on students' developmental outcomes, the first variable to be examined was college degree. The three types of degrees that were included were the bachelors of science degree, the bachelors of arts degree and the bachelors of science with a master's degree. The bachelor of arts (BA) degree provides a broader education with fewer courses focused on the major than the bachelor of science (BS) degree. The descriptive data revealed that the 81.3% of teachers earned BS degrees, 11.2% earned BA degrees, and only 7.5 % earned

BS with a master's degree. A multivariate test revealed that degree was significant (p = .012); however, the *Test of Between-Subjects Analysis* showed that degree was only significant for LNG. This may be an indication of the focus on language in a bachelor of science degree since BS programs tend to include more specific content courses. Developing language is critical for the future learning and success of young children (Dubinsky, 2010); therefore, pre-service teachers may receive more focused language arts training in a BS program as opposed to the global focus in a BA program. Additionally, it is not surprising that the data did not reveal greater significance across developmental areas. Marcy Whitebook, from the Center for the Study of Child Care Educators at U.C. Berkeley, reported that there hasn't been a strong link established between simply holding a bachelor's degree and improving student outcomes for young children (Mongeau, 2013).

Certification

The next research question explored the teachers' certification as a factor that may impact developmental outcomes. The majority of teachers (45%) earned an early childhood education certification followed by dual certification of early childhood/elementary (15%), dual certifications of early childhood/elementary and a master's degree (11%), dual certification of early childhood/special education (8%), and finally, elementary certification with additional credits in early childhood education. A multivariate test for average growth was conducted and type of certification variable presented significant results. When a between-subject analysis was completed, certification was significant for both physical and language.

Further analysis was run to determine the average developmental area growth for each certification area. The certification that showed the greatest overall average area of

growth was the dual certification of ECE/Elem (16.54) and second was ECE (14.24). As mentioned previously, the multivariate test for between-subject analysis was conducted for certification and language and physical, showed significance. Because teachers with the ECE certification have specific training to understand and assess the developmental needs of 3- and 4-year-olds, these findings seem appropriate.

It is not surprising that teachers with an early childhood certification or dual certification of early childhood and elementary were associated with greater growth for children on the GOLD assessment. The philosophies of early childhood certification programs primarily focus on developmentally appropriate practices (Vartuli, 1999), and the GOLD assessment is based on observing developmentally appropriate areas of growth (Teaching Strategies, 2010). While this study focused on the structural areas of teacher training, process areas i.e., teacher-child relationships, may also be influenced by a teacher's training (Espinosa, 2002). Teachers understand developmentally appropriate practices as they relate to interactions in the classroom.

The NIEER specifically recommends that teachers have a bachelor's degree with specialized training or a certificate in early childhood education (Mashburn et al., 2008). They also list teacher certification in its Pre-K quality standards checklist when analyzing the quality of a state's early childhood program (Barnett, Hustedt, Robin, & Schulman, 2005). Research by Wen, Elicker, and McMullen (2011) stated that there was greater correlation, for teachers' reported beliefs and observed practices when they had higher levels of skill training and experience specific to early childhood education. These practices developed through certification could result in increased student achievement.

However, there are some that disagree. Pianta (2006) proposed that teacher certification has little to do with child outcomes. He proposed that the experiences and accountability of those experiences determined success. When observations of interactions between the teacher and students in the classroom are conducted there is greater support for quality than a certification program. Only when a certification program includes specific training and practice on these interactions, does the certification matter, and, even then, it would be specific to the program that provided such training and practice. This raises the question as to whether the teacher's training in a specific program impacts child outcomes. The next research question considers this issue.

Years of Experience in the County Program

The next research question examined the years of experience in the county program as a potential variable impacting developmental outcomes. Teachers' experienced ranged from .25 years to 24 years. Due to the wide variance of years, the reported years were clustered into four levels: 0-4 years (47%), 5-10 years (32%), 11- 15 years (13%), and 16 and above (8%). The multivariate analysis indicated that average growth across years was significant. A zero-correlation analysis between areas of development and years in program was conducted and showed significant and positive correlation in all areas. Language ranked the highest correlation followed by literacy, social-emotional, cognitive, and, math and physical were tied. According to Hyson, Tomlinson, and Morris (2009), experiences that teachers have help determine the out-put of the student results. The more accountability that exists within those experiences, the more likely the teachers will be successful.

Additionally, the mean developmental area growth by years of experience was analyzed. An interesting find was, the cluster of years in the program from 11-15 years recorded was associated with greatest mean growth score across all developmental areas, especially considering the cluster only included 13% of the total teachers. From a programmatic point of view, it would be important to further investigate these differences from other clusters of teachers. Areas such as certification, degree, and professional development focus might be considered. The teacher cohort with the 11-15 years of experience in the program presented the greatest growth for cognitive and literacy development. These developmental areas also reported the second highest relationship via the Zero-Order Correlation between Areas of Development.

Not surprising is that the teacher cohort with 0-4 years' experience in the program showed the least average growth. According to Duncan et al. (2007), the experience of the teacher is critical in making appropriate connections between young children's social interactions and their learning. The lack of experience on the teacher's part to understand and implement appropriate connections between a child's behavior and academics can negatively affect the child's learning outcomes (Duncan et al., 2007).

Further examination of Table 17 revealed lower growth scores for higher levels of education; and Table 18 and Figure 2 showed the greatest growth for years of experience ranging from 11-15 years. Based on these unusual patterns, additional analysis sought to understand the association between years of experience in the program and certifications. A Pearson's chi-square analysis reveals that there is a significant association between years in the program and the educator's certifications. Table 19 illustrates this association between years of experience in the program across certifications. The

teachers with the experience in the program between 11-15 years are all represented in the ECE and ECE/Elem certifications. The highest certification levels are associated with the teachers with less experience.

Degree Granting Institution

The degree granting institution was the next variable examined as a potential variable impacting developmental outcomes. There were 15 different higher education institutions issuing degrees. With this number of institutions, it was deemed most appropriate to examine the "institution" using ANOVA. Therefore, ANOVA analysis was conducted to see if there was a relationship between child outcomes and certifying institutions. None of the areas of development presented significant results with the exception of PHY. However, Scheffe post-hoc analysis showed no statistical significance across any reported institution with the exception PHY. This variance may be due to the fact that only one teacher was identified as attending Western Governor's University which consequently presented the highest PHY average growth.

State of Certification

The final research question examined the state that granted the certification as a potential variable impacting developmental outcomes. There were a total of 15 institutions represented with 25 teachers receiving their degree in PA, five teachers receiving their degree in OH, one teacher receiving a degree in NY, and 1 teacher receiving a degree in UT. The multivariate test revealed no significant differences. Additionally, a between-subject analysis was completed with states reporting no statistically significant differences found. This is not surprising since there are significant variations between and within states specific to teacher training. Whitebook and Ryan (2011) reported tremendous variations exist between states and within state

programs regarding qualifications of early childhood teachers. This is even less surprising considering the fact that early childhood education is not mandated, nor is identified, by NCLB, 2001 (National Education Association [NEA], 2010).

Limitations

Limitations of this study included a validity threat for subjects leaving the study; however, considering only the classroom enrollment numbers and the number of students assessed in the pre- and post-assessment, the researcher concluded that they were very similar. Another limitation is the variance in the teacher's testing protocols. While teachers were required to go through training and be certified in the testing procedures, some variance could exist in regards to the teachers' fidelity to the implementation. There are also limitations around the specifics of the teachers' education i.e., the year they graduated from certifications' programs or the requirement of dual certification programs.

Future Research

There is little agreement as to what training a teacher should have in order to have positive effects on student achievement (Palardy & Rumberger, 2008). While this research study found some positive relationships between training areas i.e., certification, years of experience, and degree, further research would assist in digging deeper into these areas.

One consideration is learning more about the certification. Some early childhood certification programs stretch the age range between three and eight years of age (Maxwell, Lim, & Early, 2006); however, there is a question as to how specific or broad such programs can be in their scope of training. While in this study, the early childhood certification showed significance for two areas of development, further investigation into

the certifications is warranted. An investigation might focus on the specific age levels represented in the early childhood certification. For instance, Pennsylvania's new early childhood certification ranges from PreK-4th grade (Pennsylvania State Education Association [PSEA], 2013). There is a question as to whether this focus is too broad. There is concern that pre-service teachers are not receiving a student teaching experience in a pre-school program with developmentally appropriate practices.

Other studies might consider relationships between the cohort of teachers with 11-15 years of experience in the program and the greater growth for children. Consideration could be given to the kinds of professional development each teacher received, especially since the scores were strongest in cognition and literacy. Are these teachers more likely to have pre-school children of their own? Is there a "mid-career peak" phenomenon as suggested in Klassen & Chiu (2010)? Conversely, since the teachers with the most experience in the program did not record the greatest growth on the GOLD assessment, could this indicate an "end-of-career phenomena"?

A study conducted by NCATE (2010), identified three gaps between what effective educators need to be successful in classrooms and what teacher preparation programs offer. These gaps include insufficient coursework in child or adolescent development, lack of connection between theory and the classroom, and little consistency between coursework, classroom practice, and supervision. Further study might examine these gaps for a specific certification program.

Finally, a study might consider the evaluation process that is used for pre-service teachers within the early childhood certification program. Considering that the data revealed greater significance for experienced teachers, are programs that consider child

outcomes as evidence of an effective pre-service teacher more effective than those that provide a checklist of experiences, or an approval rating, from a cooperating teacher? A tool such as the EdTPA may be considered useful in understanding the candidates' impact on student outcomes across all the dimensions of developmental measures such as the GOLD assessment used in the current investigation.

Conclusion

The research supports that early childhood education makes a difference in the short- and long-term. It provides academic benefits for children in reducing the need for remedial services or special education, in addition to increasing academic skills, and the likelihood that students will obtain more years of education (Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Moreover, long-term advantages may be realized such as increasing rates of home ownership, earned income, employment, savings, and, lower rates of welfare (Kostelnik & Grady, 2009). These benefits ultimately profit society as higher incomes result in increased tax revenue, spending, and demands for services.

The caveat to the benefits of early childhood education was that it must be high quality. While there is little agreement among the experts as to what defines high quality, much of the research agrees on two categories of quality, process and structure (Kreader, Ferguson, & Lawrence, 2005; Espinosa, 2002). Process has to do with the experiences students have in the classroom, as well as interactions between the teachers and families. Structure, on the other hand, has to do with areas that are much more objective and easy to regulate i.e., class size, student-teacher ratio, teacher compensation, and training (Espinosa, 2002). Process is more difficult to rate since it is less objective, while structure is easier to affect and understand (Kreader, Ferguson, & Lawrence, 2005).

Because there is wide-range support suggesting that teachers play a critical role in student success (Humphrey, Koppich, & Hough, 2005; Darling-Hammond, 2000), and teachers' training is one of the factors linked to high quality early childhood education, this research investigated differences in early childhood teachers' training. The training that was linked to student outcomes included college degree, certification, years of experience in the county early childhood programs, higher education institution issuance of degrees, or state issuance of certification.

Based on the findings of this research, it was determined that there is a relationship between child outcomes and degree, certification, and years of experience in the county early childhood program. With respect to degree, while the bachelor of science degree was significant, it was only significant for the language area of development. This may be an indication that bachelor of science degree programs focus on more specific content i.e., the brain research that supports developing language-learning in young children that is critical for their future success (Dubinsky, 2010).

The early childhood certification was significant and showed greater growth than the elementary or dual certifications of early childhood/elementary or early childhood/special education. This is most likely due to the greater focus, specifically, on developmentally appropriate practices in the coursework of the early childhood certification (Vartuli, 1999) The two areas that revealed significance were physical and language. This was especially surprising since early childhood certification programs place a special emphasis on the social-emotional development of young children and understanding how they learn (Kostelnik & Grady, 2009).

Finally, analysis of years of experience in the county early childhood program showed the average growth across all areas of development was significant. Language ranked the highest correlation followed by literacy, social-emotional, cognitive, and, math and physical were tied. This is not surprising according to Hyson, Tomlinson, and Morris (2009) as they suggested the experiences that teachers have help determine the out-put of the student results. However, what was surprising was that the cluster of teachers that showed the most growth across all areas of development was teachers with 11-15 years of experience in the county early childhood program. It would be interesting to examine further differences in these teachers' training, especially since they only represented 13% of the total teachers in the county early childhood program.

The seed of this research was first sown through a study by Pat Scheffler (2009) that revealed the teacher was the strongest indicator of child outcomes. This study sought to explore the specific differences in the teacher's training that might cultivate those outcomes. Considering the significant amount of research that supports the importance of high quality early childhood education for children, their futures, and society, it is critical to continue to investigate connections between research and practice that will ultimately increase the yield of early childhood education and its *early learning harvest*.

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Appendix A

Frequencies

Statistics

Institution

N	Valid	107
	Missing	0

Institution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Clarion	13	12.1	12.1	12.1
	Concordia College	4	3.7	3.7	15.9
	Duquesne	2	1.9	1.9	17.8
	Edinboro	14	13.1	13.1	30.8
	Gannon/YSU	4	3.7	3.7	34.6
	Grove City College	4	3.7	3.7	38.3
	IUP	10	9.3	9.3	47.7
	Mercyhurst	3	2.8	2.8	50.5
	PSU	2	1.9	1.9	52.3
	SRU	18	16.8	16.8	69.2
	SRU/Edinboro	4	3.7	3.7	72.9
	Western Governor's U	4	3.7	3.7	76.6
	Westminster	8	7.5	7.5	84.1
	YSU	13	12.1	12.1	96.3
	YSU/Edinboro	4	3.7	3.7	100.0
	Total	107	100.0	100.0	

Statistics

		Institutions	Years in Program	Age of Children	# of children	SE Starting Score
N	Valid	107	107	107	107	107
	Missing	0	0	0	0	0

Statistics

		SE Ending Score	SE Average Growth	SE Type of Growth	SE Quartile of Development
N	Valid	107	107	107	107
	Missing	0	0	0	0

Institutions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Condordia	4	3.7	3.7	3.7
	YSU	13	12.1	12.1	15.9
	YSU/Edinboro	4	3.7	3.7	19.6
	Clarion	13	12.1	12.1	31.8
	Duquesne	2	1.9	1.9	33.6
	Edinboro	14	13.1	13.1	46.7
	Grove City	4	3.7	3.7	50.5
	IUP	10	9.3	9.3	59.8
	Mercyhurst	3	2.8	2.8	62.6
	PSU	2	1.9	1.9	64.5
	SRU	18	16.8	16.8	81.3
	SRU/Edinboro	4	3.7	3.7	85.0
	Westminster	8	7.5	7.5	92.5
	Gannon/YSU	4	3.7	3.7	96.3
	Western Governor's	4	3.7	3.7	100.0
	Total	107	100.0	100.0	

Years in Program

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.25	2	1.9	1.9	1.9
	.50	2	1.9	1.9	3.7
	1.00	14	13.1	13.1	16.8
	2.00	14	13.1	13.1	29.9
	3.00	14	13.1	13.1	43.0
	4.00	4	3.7	3.7	46.7
	5.00	2	1.9	1.9	48.6
	6.00	14	13.1	13.1	61.7
	7.00	14	13.1	13.1	74.8
	8.00	2	1.9	1.9	76.6
	10.00	2	1.9	1.9	78.5
	11.00	2	1.9	1.9	80.4
	12.00	2	1.9	1.9	82.2
	13.00	2	1.9	1.9	84.1
	14.00	4	3.7	3.7	87.9
	15.00	4	3.7	3.7	91.6
	20.00	2	1.9	1.9	93.5
	21.00	2	1.9	1.9	95.3
	23.00	2	1.9	1.9	97.2
	24.00	3	2.8	2.8	100.0
	Total	107	100.0	100.0	

Age of Children

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	53	49.5	49.5	49.5
	4	54	50.5	50.5	100.0
	Total	107	100.0	100.0	

# of children

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.9	.9	.9
	2	6	5.6	5.6	6.5
	3	12	11.2	11.2	17.8
	4	7	6.5	6.5	24.3
	5	14	13.1	13.1	37.4
	6	8	7.5	7.5	44.9
	7	13	12.1	12.1	57.0
	8	7	6.5	6.5	63.6
	9	15	14.0	14.0	77.6
	10	8	7.5	7.5	85.0
	11	5	4.7	4.7	89.7
	12	8	7.5	7.5	97.2
	13	2	1.9	1.9	99.1
	15	1	.9	.9	100.0
	Total	107	100.0	100.0	

SE Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-5.7	1	.9	.9	.9
	-5.4	1	.9	.9	1.9
	4.7	1	.9	.9	2.8
	6.1	1	.9	.9	3.7
	6.4	1	.9	.9	4.7
	7.1	1	.9	.9	5.6
	8.0	1	.9	.9	6.5
	8.1	2	1.9	1.9	8.4
	8.2	1	.9	.9	9.3
	8.5	2	1.9	1.9	11.2
	8.6	1	.9	.9	12.1
	8.8	1	.9	.9	13.1
	9.0	2	1.9	1.9	15.0
	9.5	1	.9	.9	15.9

9.6	2	1.9	1.9	17.8
9.8	1	.9	.9	18.7
9.9	1	.9	.9	19.6
10.0	1	.9	.9	20.6
10.1	1	.9	.9	21.5
10.5	1	.9	.9	22.4
10.8	1	.9	.9	23.4
11.0	4	3.7	3.7	27.1
11.2	2	1.9	1.9	29.0
11.3	2	1.9	1.9	30.8
11.4	2	1.9	1.9	32.7
11.6	1	.9	.9	33.6
11.7	1	.9	.9	34.6
11.9	1	.9	.9	35.5
12.0	2	1.9	1.9	37.4
12.1	1	.9	.9	38.3
12.2	2	1.9	1.9	40.2
12.7	2	1.9	1.9	42.1
12.8	1	.9	.9	43.0
13.0	4	3.7	3.7	46.7
13.1	2	1.9	1.9	48.6
13.2	3	2.8	2.8	51.4
13.4	1	.9	.9	52.3
13.5	1	.9	.9	53.3
13.6	1	.9	.9	54.2
13.9	1	.9	.9	55.1
14.2	2	1.9	1.9	57.0
14.3	1	.9	.9	57.9
14.4	2	1.9	1.9	59.8
14.5	2	1.9	1.9	61.7
14.6	3	2.8	2.8	64.5
14.7	1	.9	.9	65.4
14.8	1	.9	.9	66.4
15.0	2	1.9	1.9	68.2
15.2	1	.9	.9	69.2

	15.3	1	.9	.9	70.1
	15.4	1	.9	.9	71.0
	15.7	1	.9	.9	72.0
	16.6	2	1.9	1.9	73.8
	16.7	1	.9	.9	74.8
	17.1	2	1.9	1.9	76.6
	17.2	1	.9	.9	77.6
	17.4	1	.9	.9	78.5
	18.0	1	.9	.9	79.4
	18.5	1	.9	.9	80.4
	18.7	1	.9	.9	81.3
	18.8	1	.9	.9	82.2
	18.9	1	.9	.9	83.2
	19.2	1	.9	.9	84.1
	19.4	1	.9	.9	85.0
	20.0	2	1.9	1.9	86.9
	20.5	1	.9	.9	87.9
	20.6	1	.9	.9	88.8
	21.0	2	1.9	1.9	90.7
	22.1	1	.9	.9	91.6
	22.9	1	.9	.9	92.5
	23.7	2	1.9	1.9	94.4
	23.8	1	.9	.9	95.3
	24.7	1	.9	.9	96.3
	25.0	1	.9	.9	97.2
	25.7	1	.9	.9	98.1
	27.3	1	.9	.9	99.1
	29.3	1	.9	.9	100.0
	Total	107	100.0	100.0	

SE Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Met	3	2.8	2.8	2.8
	Met	104	97.2	97.2	100.0
	Total	107	100.0	100.0	

Statistics

		LIT Starting Score	LIT Ending Score	LIT Average Growth	LIT Type of Growth	LIT Quartile
N	Valid	107	107	107	107	107
	Missing	0	0	0	0	0

SE Quartile of Development

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-24	3	2.8	2.8	2.8
	25-49	65	60.7	60.7	63.6
	50-74	32	29.9	29.9	93.5
	75-100	7	6.5	6.5	100.0
	Total	107	100.0	100.0	

Statistics

		PHY Starting Score	PHY Ending Score	PHY Average Growth	PHY Type of Growth	PHY Quartile
N	Valid	107	107	107	102	107
	Missing	0	0	0	5	0

Statistics

		LNG Starting Score	LNG Ending Score	LNG Average Growth	LNG Type of Growth	LNG Quartile
N	Valid	107	107	107	107	107
	Missing	0	0	0	0	0

Statistics

		COG Starting Score	COG Ending Score	COG Average Growth	COG Type of Growth	LNG Quartile
N	Valid	107	107	107	101	107
	Missing	0	0	0	6	0

Statistics

		MATH Starting Score	MATH Ending Score	MATH Average Growth	MATH Type of Growth	MATH Quartile
N	Valid	105	105	105	105	105
	Missing	2	2	2	2	2

PHY Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-5.0	1	.9	.9	.9
	-2.6	1	.9	.9	1.9
	-.7	1	.9	.9	2.8
	-.1	1	.9	.9	3.7
	.7	1	.9	.9	4.7
	2.0	2	1.9	1.9	6.5
	2.4	1	.9	.9	7.5
	2.7	1	.9	.9	8.4
	3.0	1	.9	.9	9.3
	3.1	1	.9	.9	10.3
	3.5	1	.9	.9	11.2
	3.6	1	.9	.9	12.1
	3.8	1	.9	.9	13.1
	4.0	2	1.9	1.9	15.0
	4.2	1	.9	.9	15.9
	4.3	2	1.9	1.9	17.8
	4.4	3	2.8	2.8	20.6
	4.6	2	1.9	1.9	22.4
	4.7	2	1.9	1.9	24.3
	5.0	7	6.5	6.5	30.8
	5.1	1	.9	.9	31.8
	5.2	4	3.7	3.7	35.5
	5.3	2	1.9	1.9	37.4
	5.5	2	1.9	1.9	39.3
	5.6	2	1.9	1.9	41.1
	5.7	1	.9	.9	42.1
	5.8	2	1.9	1.9	43.9
	6.0	3	2.8	2.8	46.7
	6.1	1	.9	.9	47.7
	6.3	2	1.9	1.9	49.5
	6.4	1	.9	.9	50.5
	6.8	2	1.9	1.9	52.3
	6.9	3	2.8	2.8	55.1
	7.0	2	1.9	1.9	57.0

7.1	3	2.8	2.8	59.8
7.2	1	.9	.9	60.7
7.4	1	.9	.9	61.7
7.5	3	2.8	2.8	64.5
7.6	2	1.9	1.9	66.4
7.8	2	1.9	1.9	68.2
7.9	1	.9	.9	69.2
8.0	2	1.9	1.9	71.0
8.3	1	.9	.9	72.0
8.4	2	1.9	1.9	73.8
8.5	1	.9	.9	74.8
8.6	1	.9	.9	75.7
8.7	1	.9	.9	76.6
8.8	2	1.9	1.9	78.5
9.0	2	1.9	1.9	80.4
9.1	2	1.9	1.9	82.2
9.2	2	1.9	1.9	84.1
9.4	1	.9	.9	85.0
9.6	1	.9	.9	86.0
9.7	1	.9	.9	86.9
9.8	1	.9	.9	87.9
9.9	2	1.9	1.9	89.7
10.0	1	.9	.9	90.7
10.4	1	.9	.9	91.6
10.5	1	.9	.9	92.5
11.0	1	.9	.9	93.5
11.3	2	1.9	1.9	95.3
11.6	1	.9	.9	96.3
12.5	1	.9	.9	97.2
13.3	1	.9	.9	98.1
13.6	1	.9	.9	99.1
14.3	1	.9	.9	100.0
Total	107	100.0	100.0	

PHY Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Met	102	95.3	100.0	100.0
Missing	System	5	4.7		
Total		107	100.0		

PHY Quartile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	.9	.9	.9
	0-24	5	4.7	4.7	5.6
	25-49	53	49.5	49.5	55.1
	50-74	44	41.1	41.1	96.3
	75-100	4	3.7	3.7	100.0
	Total	107	100.0	100.0	

LNG Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.9	1	.9	.9	.9
	-1.4	1	.9	.9	1.9
	4.0	1	.9	.9	2.8
	4.2	1	.9	.9	3.7
	4.4	1	.9	.9	4.7
	4.7	1	.9	.9	5.6
	5.4	1	.9	.9	6.5
	5.6	1	.9	.9	7.5
	5.7	1	.9	.9	8.4
	5.9	1	.9	.9	9.3
	6.1	1	.9	.9	10.3
	6.4	1	.9	.9	11.2
	7.0	1	.9	.9	12.1
	7.3	1	.9	.9	13.1
	7.4	1	.9	.9	14.0
	7.5	1	.9	.9	15.0

7.8	2	1.9	1.9	16.8
7.9	2	1.9	1.9	18.7
8.0	5	4.7	4.7	23.4
8.3	1	.9	.9	24.3
8.4	1	.9	.9	25.2
8.5	1	.9	.9	26.2
8.6	1	.9	.9	27.1
8.7	4	3.7	3.7	30.8
8.9	2	1.9	1.9	32.7
9.1	1	.9	.9	33.6
9.2	1	.9	.9	34.6
9.3	2	1.9	1.9	36.4
9.5	3	2.8	2.8	39.3
9.6	1	.9	.9	40.2
10.0	1	.9	.9	41.1
10.2	1	.9	.9	42.1
10.3	1	.9	.9	43.0
10.4	2	1.9	1.9	44.9
10.5	2	1.9	1.9	46.7
10.7	1	.9	.9	47.7
11.0	2	1.9	1.9	49.5
11.3	2	1.9	1.9	51.4
11.4	1	.9	.9	52.3
11.6	2	1.9	1.9	54.2
11.7	1	.9	.9	55.1
12.0	3	2.8	2.8	57.9
12.5	2	1.9	1.9	59.8
12.7	1	.9	.9	60.7
12.8	1	.9	.9	61.7
13.0	3	2.8	2.8	64.5
13.2	3	2.8	2.8	67.3
13.3	1	.9	.9	68.2
13.5	2	1.9	1.9	70.1
13.6	1	.9	.9	71.0
13.8	2	1.9	1.9	72.9

	14.0	1	.9	.9	73.8
	14.5	1	.9	.9	74.8
	14.6	4	3.7	3.7	78.5
	14.8	1	.9	.9	79.4
	15.0	1	.9	.9	80.4
	15.2	1	.9	.9	81.3
	15.8	1	.9	.9	82.2
	15.9	1	.9	.9	83.2
	16.0	1	.9	.9	84.1
	16.2	1	.9	.9	85.0
	16.3	1	.9	.9	86.0
	16.8	1	.9	.9	86.9
	17.1	2	1.9	1.9	88.8
	17.4	1	.9	.9	89.7
	17.8	1	.9	.9	90.7
	18.3	1	.9	.9	91.6
	18.5	1	.9	.9	92.5
	18.6	1	.9	.9	93.5
	19.3	2	1.9	1.9	95.3
	20.2	1	.9	.9	96.3
	20.3	1	.9	.9	97.2
	23.5	1	.9	.9	98.1
	24.4	1	.9	.9	99.1
	27.5	1	.9	.9	100.0
	Total	107	100.0	100.0	

LNG Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Met	4	3.7	3.7	3.7
	Met	103	96.3	96.3	100.0
	Total	107	100.0	100.0	

LNG Quartile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-24	4	3.7	3.7	3.7
	25-49	51	47.7	47.7	51.4
	50-74	44	41.1	41.1	92.5
	75-100	8	7.5	7.5	100.0
	Total	107	100.0	100.0	

COG Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.1	1	.9	.9	.9
	1.4	1	.9	.9	1.9
	4.5	1	.9	.9	2.8
	5.0	1	.9	.9	3.7
	6.0	1	.9	.9	4.7
	6.5	1	.9	.9	5.6
	6.6	1	.9	.9	6.5
	6.8	1	.9	.9	7.5
	6.9	1	.9	.9	8.4
	7.6	1	.9	.9	9.3
	8.0	2	1.9	1.9	11.2
	8.3	1	.9	.9	12.1
	8.5	1	.9	.9	13.1
	8.6	1	.9	.9	14.0
	9.0	2	1.9	1.9	15.9
	9.1	1	.9	.9	16.8
	9.3	1	.9	.9	17.8
	9.6	1	.9	.9	18.7
	9.7	1	.9	.9	19.6
	9.8	1	.9	.9	20.6
	10.3	1	.9	.9	21.5
	10.6	2	1.9	1.9	23.4
	10.7	2	1.9	1.9	25.2
	10.9	2	1.9	1.9	27.1

11.0	2	1.9	1.9	29.0
11.1	1	.9	.9	29.9
11.2	1	.9	.9	30.8
11.4	1	.9	.9	31.8
11.5	2	1.9	1.9	33.6
11.7	2	1.9	1.9	35.5
11.8	3	2.8	2.8	38.3
12.4	1	.9	.9	39.3
12.6	1	.9	.9	40.2
12.7	1	.9	.9	41.1
12.8	1	.9	.9	42.1
13.0	1	.9	.9	43.0
13.2	1	.9	.9	43.9
13.3	1	.9	.9	44.9
13.6	2	1.9	1.9	46.7
13.7	1	.9	.9	47.7
13.8	1	.9	.9	48.6
14.1	1	.9	.9	49.5
14.2	2	1.9	1.9	51.4
14.4	2	1.9	1.9	53.3
14.5	1	.9	.9	54.2
14.6	1	.9	.9	55.1
14.7	2	1.9	1.9	57.0
14.8	1	.9	.9	57.9
15.4	1	.9	.9	58.9
16.2	1	.9	.9	59.8
16.4	1	.9	.9	60.7
16.5	1	.9	.9	61.7
16.6	1	.9	.9	62.6
16.8	1	.9	.9	63.6
17.1	1	.9	.9	64.5
17.3	1	.9	.9	65.4
17.4	2	1.9	1.9	67.3
17.6	1	.9	.9	68.2
17.9	2	1.9	1.9	70.1

LNG Quartile

18.0	1	.9	.9	71.0
18.2	2	1.9	1.9	72.9
18.4	1	.9	.9	73.8
18.5	1	.9	.9	74.8
18.6	2	1.9	1.9	76.6
18.8	1	.9	.9	77.6
19.3	1	.9	.9	78.5
19.4	1	.9	.9	79.4
19.5	1	.9	.9	80.4
19.7	1	.9	.9	81.3
20.1	1	.9	.9	82.2
20.7	1	.9	.9	83.2
21.0	2	1.9	1.9	85.0
21.2	1	.9	.9	86.0
21.5	1	.9	.9	86.9
22.0	1	.9	.9	87.9
22.3	1	.9	.9	88.8
22.5	1	.9	.9	89.7
23.1	1	.9	.9	90.7
23.4	1	.9	.9	91.6
23.7	1	.9	.9	92.5
25.0	1	.9	.9	93.5
26.1	1	.9	.9	94.4
26.2	1	.9	.9	95.3
27.6	1	.9	.9	96.3
29.5	1	.9	.9	97.2
30.2	1	.9	.9	98.1
31.4	1	.9	.9	99.1
37.6	1	.9	.9	100.0
Total	107	100.0	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-24	6	5.6	5.6	5.6
	25-49	51	47.7	47.7	53.3
	50-74	41	38.3	38.3	91.6
	75-100	9	8.4	8.4	100.0
	Total	107	100.0	100.0	

LIT Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.5	1	.9	.9	.9
	6.4	1	.9	.9	1.9
	7.0	1	.9	.9	2.8
	7.3	1	.9	.9	3.7
	8.7	1	.9	.9	4.7
	9.0	1	.9	.9	5.6
	9.3	1	.9	.9	6.5
	9.5	1	.9	.9	7.5
	10.4	1	.9	.9	8.4
	11.3	2	1.9	1.9	10.3
	11.6	1	.9	.9	11.2
	12.0	1	.9	.9	12.1
	12.1	1	.9	.9	13.1
	12.5	1	.9	.9	14.0
	13.0	1	.9	.9	15.0
	13.4	2	1.9	1.9	16.8
	13.5	1	.9	.9	17.8
	13.6	2	1.9	1.9	19.6
	13.8	1	.9	.9	20.6
	14.0	1	.9	.9	21.5
	14.4	1	.9	.9	22.4
	15.3	1	.9	.9	23.4
	15.7	1	.9	.9	24.3
	16.0	1	.9	.9	25.2
	16.5	1	.9	.9	26.2
	16.7	2	1.9	1.9	28.0
	16.8	1	.9	.9	29.0

17.3	1	.9	.9	29.9
17.4	1	.9	.9	30.8
17.7	1	.9	.9	31.8
17.8	3	2.8	2.8	34.6
18.0	1	.9	.9	35.5
18.2	1	.9	.9	36.4
18.4	2	1.9	1.9	38.3
18.6	1	.9	.9	39.3
18.7	1	.9	.9	40.2
18.8	1	.9	.9	41.1
19.0	2	1.9	1.9	43.0
19.7	1	.9	.9	43.9
19.9	1	.9	.9	44.9
20.0	1	.9	.9	45.8
20.9	1	.9	.9	46.7
21.1	1	.9	.9	47.7
21.5	1	.9	.9	48.6
21.9	1	.9	.9	49.5
22.0	3	2.8	2.8	52.3
22.2	2	1.9	1.9	54.2
22.3	2	1.9	1.9	56.1
22.5	1	.9	.9	57.0
22.6	1	.9	.9	57.9
23.0	1	.9	.9	58.9
23.1	1	.9	.9	59.8
23.4	1	.9	.9	60.7
23.5	1	.9	.9	61.7
24.0	3	2.8	2.8	64.5
24.1	1	.9	.9	65.4
24.4	1	.9	.9	66.4
24.7	1	.9	.9	67.3
25.2	1	.9	.9	68.2
25.5	1	.9	.9	69.2
26.0	4	3.7	3.7	72.9
26.6	1	.9	.9	73.8

	26.8	1	.9	.9	74.8
	27.0	1	.9	.9	75.7
	27.1	2	1.9	1.9	77.6
	27.2	1	.9	.9	78.5
	27.4	1	.9	.9	79.4
	27.5	1	.9	.9	80.4
	27.8	1	.9	.9	81.3
	28.0	2	1.9	1.9	83.2
	28.7	1	.9	.9	84.1
	29.3	1	.9	.9	85.0
	29.5	1	.9	.9	86.0
	29.7	1	.9	.9	86.9
	29.9	1	.9	.9	87.9
	30.0	1	.9	.9	88.8
	30.7	1	.9	.9	89.7
	31.4	1	.9	.9	90.7
	31.6	1	.9	.9	91.6
	34.2	1	.9	.9	92.5
	35.2	1	.9	.9	93.5
	36.1	1	.9	.9	94.4
	40.2	1	.9	.9	95.3
	40.3	1	.9	.9	96.3
	44.4	1	.9	.9	97.2
	46.9	1	.9	.9	98.1
	47.7	1	.9	.9	99.1
	52.0	1	.9	.9	100.0
	Total	107	100.0	100.0	

LIT Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Met	6	5.6	5.6	5.6
	Met	101	94.4	94.4	100.0
	Total	107	100.0	100.0	

LIT Quartile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-24	6	5.6	5.6	5.6
	25-49	40	37.4	37.4	43.0
	50-74	50	46.7	46.7	89.7
	75-100	11	10.3	10.3	100.0
	Total	107	100.0	100.0	

MATH Average Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.0	1	.9	1.0	1.0
	3.7	1	.9	1.0	1.9
	4.8	1	.9	1.0	2.9
	5.0	1	.9	1.0	3.8
	5.5	1	.9	1.0	4.8
	5.8	1	.9	1.0	5.7
	6.4	1	.9	1.0	6.7
	6.5	1	.9	1.0	7.6
	6.9	1	.9	1.0	8.6
	7.0	1	.9	1.0	9.5
	7.7	1	.9	1.0	10.5
	7.8	1	.9	1.0	11.4
	8.0	2	1.9	1.9	13.3
	8.2	2	1.9	1.9	15.2
	8.3	1	.9	1.0	16.2
	8.4	2	1.9	1.9	18.1
	8.6	2	1.9	1.9	20.0
	9.0	3	2.8	2.9	22.9
	9.2	2	1.9	1.9	24.8
	9.6	2	1.9	1.9	26.7
	9.7	1	.9	1.0	27.6
	9.8	1	.9	1.0	28.6
	10.0	2	1.9	1.9	30.5
	10.1	1	.9	1.0	31.4

10.3	1	.9	1.0	32.4
10.4	1	.9	1.0	33.3
10.6	2	1.9	1.9	35.2
10.7	2	1.9	1.9	37.1
11.0	2	1.9	1.9	39.0
11.2	2	1.9	1.9	41.0
11.3	1	.9	1.0	41.9
11.5	1	.9	1.0	42.9
11.7	1	.9	1.0	43.8
11.8	1	.9	1.0	44.8
12.0	1	.9	1.0	45.7
12.2	2	1.9	1.9	47.6
12.4	2	1.9	1.9	49.5
12.6	2	1.9	1.9	51.4
12.8	1	.9	1.0	52.4
13.1	1	.9	1.0	53.3
13.2	1	.9	1.0	54.3
13.3	1	.9	1.0	55.2
13.4	3	2.8	2.9	58.1
13.8	1	.9	1.0	59.0
13.9	2	1.9	1.9	61.0
14.0	2	1.9	1.9	62.9
14.3	2	1.9	1.9	64.8
14.4	1	.9	1.0	65.7
14.5	2	1.9	1.9	67.6
14.9	1	.9	1.0	68.6
15.0	2	1.9	1.9	70.5
15.3	1	.9	1.0	71.4
15.5	1	.9	1.0	72.4
15.7	1	.9	1.0	73.3
15.8	1	.9	1.0	74.3
16.2	1	.9	1.0	75.2
16.4	1	.9	1.0	76.2
16.8	1	.9	1.0	77.1
16.9	1	.9	1.0	78.1
17.0	2	1.9	1.9	80.0

	17.7	2	1.9	1.9	81.9
	18.1	2	1.9	1.9	83.8
	18.3	2	1.9	1.9	85.7
	18.4	1	.9	1.0	86.7
	18.5	1	.9	1.0	87.6
	18.9	1	.9	1.0	88.6
	19.2	1	.9	1.0	89.5
	19.5	1	.9	1.0	90.5
	19.6	1	.9	1.0	91.4
	20.0	1	.9	1.0	92.4
	20.4	1	.9	1.0	93.3
	20.6	1	.9	1.0	94.3
	21.7	1	.9	1.0	95.2
	22.0	1	.9	1.0	96.2
	22.4	1	.9	1.0	97.1
	22.7	1	.9	1.0	98.1
	24.5	1	.9	1.0	99.0
	29.3	1	.9	1.0	100.0
	Total	105	98.1	100.0	
Missing	System	2	1.9		
Total		107	100.0		

MATH Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Met	3	2.8	2.9	2.9
	Met	102	95.3	97.1	100.0
	Total	105	98.1	100.0	
Missing	System	2	1.9		
Total		107	100.0		

MATH Quartile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-24	3	2.8	2.9	2.9
	25-49	43	40.2	41.0	43.8
	50-74	44	41.1	41.9	85.7
	75-100	15	14.0	14.3	100.0
	Total	105	98.1	100.0	
Missing	System	2	1.9		
Total		107	100.0		

Statistics

		Overall starting	Overall ending	Overall average	Overall type of growth	Overall quartile
N	Valid	107	107	107	107	107
	Missing	0	0	0	0	0

Overall average

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.43	1	.9	.9	.9
	2.90	1	.9	.9	1.9
	5.67	1	.9	.9	2.8
	6.58	1	.9	.9	3.7
	6.63	1	.9	.9	4.7
	7.32	1	.9	.9	5.6
	7.60	1	.9	.9	6.5
	7.67	1	.9	.9	7.5
	7.78	1	.9	.9	8.4
	7.83	1	.9	.9	9.3
	7.90	1	.9	.9	10.3
	8.03	1	.9	.9	11.2
	8.17	1	.9	.9	12.1
	8.67	1	.9	.9	13.1
	8.73	1	.9	.9	14.0
	8.82	1	.9	.9	15.0
	9.27	1	.9	.9	15.9
	9.32	1	.9	.9	16.8
	9.50	1	.9	.9	17.8
	9.62	1	.9	.9	18.7
	9.70	1	.9	.9	19.6

9.78	3	2.8	2.8	22.4
10.03	1	.9	.9	23.4
10.08	1	.9	.9	24.3
10.10	1	.9	.9	25.2
10.45	1	.9	.9	26.2
10.47	1	.9	.9	27.1
10.52	1	.9	.9	28.0
10.73	2	1.9	1.9	29.9
10.75	1	.9	.9	30.8
10.92	1	.9	.9	31.8
11.08	1	.9	.9	32.7
11.08	1	.9	.9	33.6
11.12	1	.9	.9	34.6
11.28	1	.9	.9	35.5
11.54	1	.9	.9	36.4
11.57	1	.9	.9	37.4
11.60	2	1.9	1.9	39.3
11.68	1	.9	.9	40.2
11.83	1	.9	.9	41.1
11.97	1	.9	.9	42.1
12.05	1	.9	.9	43.0
12.27	1	.9	.9	43.9
12.62	1	.9	.9	44.9
12.70	1	.9	.9	45.8
12.85	1	.9	.9	46.7
12.90	2	1.9	1.9	48.6
13.05	1	.9	.9	49.5
13.13	1	.9	.9	50.5
13.45	1	.9	.9	51.4
13.50	1	.9	.9	52.3
13.62	2	1.9	1.9	54.2
13.72	1	.9	.9	55.1
13.78	1	.9	.9	56.1
13.83	1	.9	.9	57.0
14.18	1	.9	.9	57.9

14.27	1	.9	.9	58.9
14.40	1	.9	.9	59.8
14.53	1	.9	.9	60.7
14.55	1	.9	.9	61.7
14.57	1	.9	.9	62.6
14.67	1	.9	.9	63.6
14.77	1	.9	.9	64.5
14.90	1	.9	.9	65.4
15.18	1	.9	.9	66.4
15.33	1	.9	.9	67.3
15.43	1	.9	.9	68.2
15.55	1	.9	.9	69.2
15.68	1	.9	.9	70.1
15.75	1	.9	.9	71.0
15.80	1	.9	.9	72.0
15.83	1	.9	.9	72.9
15.83	1	.9	.9	73.8
15.87	1	.9	.9	74.8
16.15	1	.9	.9	75.7
16.55	1	.9	.9	76.6
16.65	1	.9	.9	77.6
16.90	1	.9	.9	78.5
16.93	1	.9	.9	79.4
17.13	1	.9	.9	80.4
17.80	1	.9	.9	81.3
17.85	1	.9	.9	82.2
18.03	2	1.9	1.9	84.1
18.22	1	.9	.9	85.0
18.45	1	.9	.9	86.0
18.75	1	.9	.9	86.9
18.88	1	.9	.9	87.9
19.15	1	.9	.9	88.8
19.32	1	.9	.9	89.7
19.78	1	.9	.9	90.7
20.43	1	.9	.9	91.6

	20.62	1	.9	.9	92.5
	21.32	1	.9	.9	93.5
	21.47	1	.9	.9	94.4
	21.53	1	.9	.9	95.3
	25.75	1	.9	.9	96.3
	26.12	1	.9	.9	97.2
	26.27	1	.9	.9	98.1
	26.83	1	.9	.9	99.1
	28.35	1	.9	.9	100.0
	Total	107	100.0	100.0	

Overall Type of Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.25	1	.9	.9	.9
	.50	1	.9	.9	1.9
	.80	3	2.8	2.8	4.7
	.83	8	7.5	7.5	12.1
	1.00	94	87.9	87.9	100.0
	Total	107	100.0	100.0	

Overall Quartile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.17	1	.9	.9	.9
	1.33	1	.9	.9	1.9
	1.67	1	.9	.9	2.8
	1.83	9	8.4	8.4	11.2
	2.00	16	15.0	15.0	26.2
	2.17	16	15.0	15.0	41.1
	2.20	2	1.9	1.9	43.0
	2.33	8	7.5	7.5	50.5
	2.50	8	7.5	7.5	57.9
	2.67	4	3.7	3.7	61.7
	2.83	12	11.2	11.2	72.9

3.00	12	11.2	11.2	84.1
3.17	6	5.6	5.6	89.7
3.33	4	3.7	3.7	93.5
3.50	2	1.9	1.9	95.3
3.67	1	.9	.9	96.3
3.83	2	1.9	1.9	98.1
4.00	2	1.9	1.9	100.0
Total	107	100.0	100.0	

Appendix B

Youngstown
STATE UNIVERSITY

One University Plaza, Youngstown, Ohio 44555
Office of Grants and Sponsored Programs
330.941.2377
www.ysu.edu

April 4, 2016

Dr. Karen Larwin, Principal Investigator
Ms. Kimberly Zippie, Co-investigator
Department of Educational Foundations, Research, Technology & Leadership
UNIVERSITY

RE: IRSC Protocol Number: 132-2016
Title: The Early Learning Harvest: The Relationship between Teacher Educational Levels and Child Outcomes

Dear Dr. Larwin and Ms. Zippie:

The Institutional Review Board has reviewed the abovementioned protocol and determined that it is exempt from full committee review based on a DHHS Category 5 exemption.

Any changes in your research activity should be promptly reported to the Institutional Review Board and may not be initiated without IRB approval except where necessary to eliminate hazard to human subjects. Any unanticipated problems involving risks to subjects should also be promptly reported to the IRB.

The IRB would like to extend its best wishes to you in the conduct of this study.

Sincerely,

Mr. Michael A. Hripko
Associate Vice President for Research
Authorized Institutional Official

MAH:cc

c: Dr. Charles Vergon, Acting Chair
Department of Educational Foundations, Research, Technology & Leadership