

**EARLY EXPERIENCES AND THE EFFECT ON
KINDERGARTEN SCREENING**

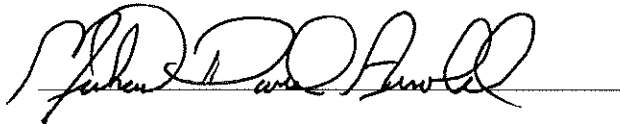
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2015

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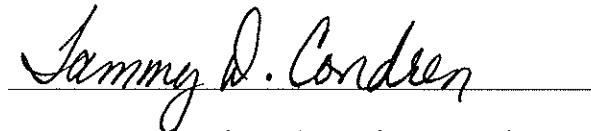
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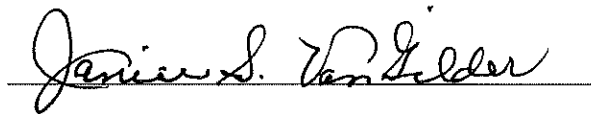
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**EARLY EXPERIENCES AND THE EFFECT ON
KINDERGARTEN SCREENING**

A Dissertation

Presented to

The Faculty of the Graduate Education Department

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

By

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Dr. Michael Arnold, Dissertation Advisor

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"I can do all things through Christ who strengthens me" (Philippians 4:13).

This verse is a stronghold of my faith, and I give abundant thanks for the guidance of Jesus Christ as I travel this journey of study and growth.

My path of educational experiences has not been straight, or continuous. All along the way from 1976 to 2015, I have had the support and encouragement of my family. My daughters, Amber and Megan, learned early to take responsibility. My parents, Wendell and the late Jayne Flesher have always been in my corner with their encouragement, prayers, and praise and now Dad's "How's the paper coming, girl?" inquiry on a regular basis.

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ABSTRACT

Diverseness within our society has children entering Kindergarten with a wide variety of early experiences and learning opportunities. Developmental screening prior to Kindergarten entrance has become a common factor for children near five years of age. How they perform on this screener is varied, but used to determine the degree of readiness for formal learning. This study compares 539 students who participated in the DIAL-4 screening prior to Kindergarten entrance. Comparison is made between those students who report no formal preschool attendance, those who attended a public preschool, a private preschool, Head Start, or participated in Parents as Teachers only. Another value examined is the combination of formal preschool and Parents as Teachers. The areas of Motor, Concepts, Language and Total score are analyzed, as well as percentiles to determine if children are entering Kindergarten ready to learn.

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CHAPTER ONE

INTRODUCTION

Introduction

Children entering Kindergarten arrive with a wide variety of readiness skills. The continuing achievement gap between children deemed ready and those seen as not ready continues into the middle school and high school years. Barnett and Barnett (1988) discuss The Carnegie Foundation's survey of more than 7,000 Kindergarten teachers regarding the readiness of children entering their class. These Kindergarten teachers believed their current students were more poorly prepared for school than those they taught five years prior. Conversations by the researcher with local kindergarten teachers since 2011 support this feeling. The area of greatest concern was the language development of the students. The Carnegie Foundation study was based not on documentation, but on teachers' impressions.

Early experiences of children arriving at Kindergarten fluctuate from encompassing children who are very prepared to those not yet ready. The most profound element in the preparedness for Kindergarten is oral language (Crawford-Brooke, 2013). Children arrive with differing language abilities based on their experiences. Their exposure varies due to many factors from social economic background, parents' educational level, and English is not spoken in the home. Some children are just exposed to short imperatives that are typically negative such as Stop that or No...Quit, while other children tend to have language interactions that include descriptive language, longer narrations and more positive reinforcement for their actions. The stability of the child's life also has an impact on their development. Those children who move frequently,

change childcare arrangements many times, and have custodial diversity, are prime candidates for low language development (Crawford-Brooke, 2013).

Parent involvement with multiple activities often limits interactive time with their children. Routines that encourage and support the child's accomplishments, routines, and involve language development require adult involvement (Barnet, 1988). Frequently the children in greatest need of readiness skills are those of low-income status. As society has changed, an increasing number of families do not eat meals together where table conversations lead to greater language development. The continuous playing of the television is also seen as an inhibitor to language readiness. While there is emphasis in having students career or college ready and many policies are being drafted on the inequalities the financial status of the family of origin has on student achievement, it is of equal importance to go to the beginning of formal education and look at the milestones before high school: the frequently overlooked early childhood years (Guilfoyle, 2013).

Pfannenstiel and Zigler (2006) revisited their 2002 study that used path analysis to test how the pilot project of the Parents as Teachers (PAT) *Born to Learn*TM program affects participants' school readiness. Subjects included 2,375 Kindergarten children in Missouri in the public schools in 1998. Results showed PAT participating children in the study had more actively involved parents, even in impoverished neighborhoods. These children entered school with readiness skills that equaled those of those children from more affluent neighborhoods. Follow-up on the PAT children continued up to third grade, where the positive impact was still being felt. This held true with two more cohorts of children entering Missouri Kindergarten in 1999 and 2000 (Pfannenstiel, Zigler, 2006). Celebrating its 30th anniversary in 2014, Parents as Teachers has placed the curriculum

online and continues to revise and improve the materials to meet the needs of modern families. As of this writing, the most recent update was October, 2015 (ParentsasTeachers.org, 2015).

Kindergarten readiness in general will be examined as it relates to the early experiences children have been exposed to starting at birth. The readiness status of children will be grouped by learning experiences guided by participation in daycare, Parents as Teachers, private preschool, Head Start, and public preschool. The level of readiness will be determined by the national normed Developmental Indicators for the Assessment of Learning (DIAL-4) currently used by many school districts for screening as children enter Kindergarten.

Problem Statement

Variety of exposure and participation in learning activities is becoming more evident with the difference in screening scores of children entering Kindergarten. The question becomes is there a relationship between early childhood experiences and overall readiness on the DIAL-4? Problematically, children are arriving at Kindergarten with various levels of readiness skills that may be influenced by the early experiences and environments they encounter. Specific subset questions include:

1. Is there a statistically significant relationship between early childhood experiences and overall performance on the DIAL -4?
2. Is there a statistically significant relationship between early childhood experiences and performance on individual areas of the DIAL 4?
3. Does gender play a role in school readiness?

Missouri's second goal in its Top 10 by 20 Missouri Proud program calls for all students to enter Kindergarten ready to learn. With the developmental readiness of the brain to accept new experiences at the age of Kindergarten entrance, educators have an opportunity to make a difference in the lives of children, regardless of experiential background. This study looked at types of preschool experiences children had prior to Kindergarten entrance.

Null Hypothesis

Results of this study will compare student scores on the DIAL-4 in the areas of Language, Concepts, Motor and the Total Score. Factors of gender, formal preschool experience and Parents as Teachers participation and combinations thereof will be examined in order to test the following Null Hypotheses.

1. There is no relationship between early childhood experiences and overall performance on the DIAL-4.
2. There is no relationship between early childhood experiences and individual areas of the DIAL-4.
3. There is no relationship between early experiences and gender on the DIAL-4.

Rationale for the Study

National Education Goal #1 developed by President George H.W. Bush and the 50 state governors in 1990 states children will arrive at school ready to learn. The National Education Goals Panel (NEGP) established that a child's readiness for school is a collaborative process with three main factors: availability of high quality programs, parent participation and support and the child's physical and mental health (Cappelloni, 2013). As a part of Missouri's Top 10 by 20 campaign Goal #2 states "All Missouri

children will enter Kindergarten prepared to be successful in school" (Missouri Department of Elementary and Secondary Education, 2012, np). Elliot (2000) believes the early experiences a child has before Kindergarten encompass the greatest learning window. The quality of the environment children are exposed to is critical. Educational neuroscience explains that children's brains start growing and developing shortly after conception. The neural tube is closed on both ends by 26 days after conception. Throughout gestation, infancy, toddlerhood and preschool years, the environments and experiences that the brain is exposed to shapes its size and connections (Eliot, 2000). Age five is too late to begin educating children (Barnet, 1988, Eliot, 2000, Sousa, 2011). Lack of readiness does not typically level out as students get older. Only about one in ten fourth graders that start out behind in Kindergarten will be meeting benchmarks by eighth grade (Guilfoyle, 2013). Guilfoyle states a child only has one chance to get a good start for life lifelong success. Environments should be safe, nurturing, and stimulating to foster academic growth and lead to lifelong success (Guilfoyle, 2013). Auerbach (2004) writes "Science tells us that the first few years of life are crucial for a child's brain development"(p.1) and further indicates that the quality of those early years sets the stage for the child's future. School readiness begins at birth and is influenced by all of the significant caregivers.

Missouri has been a leader in public early childhood education. The first public Kindergarten in the United States was opened in St. Louis, Missouri in 1873 by Susan Blow (Shepley, 2008). As Early Childhood came to the forefront both nationally and internationally, Missouri not only followed the federal initiatives, but went on to produce their own home visiting project, Parents as Teachers, which went state-wide in 1984, is

now in all 50 states, seven foreign countries and four U.S. territories (DESE, 2005). Curriculum needs for primary age children was addressed by the development of the Project Construct Framework. This is based on the constructivist philosophy of learning by doing and encourages collaboration, working together, and motivating learning by encouraging children to take the initiative in their learning (Project Construct, 2000). Missouri Learning Standards were developed to merge with the Missouri Grade Level Expectations. House Bill 1549 was approved by the Missouri Legislature in 1998, establishing the ongoing Missouri Preschool Project (MO DESE, 2015).

Independent Variables

Independent variables will be the type of preschool experiences along with gender.

1. Home - no formal preschool experience
2. Public School preschool experience
3. Private preschool experience
4. Head Start
5. Parents as Teachers

Dependent Variables

The dependent variables are the four components measured with the DIAL-4.

1. Motor
2. Concepts
3. Language and
4. Total score

Limitations and Delimitations

Limitations.

Limited to eight school districts in Southwest Missouri, this study did not have as wide a range of participants as anticipated. Timing of when the electronic survey was conveyed to district administrators was a deterrent to participation due to expired contract time of personnel involved with Kindergarten screening. Survey was mailed to 83 administrators on May 20, 2015, followed by a reminder on June 1, 2015. One district provided 42 percent of the participants. Two large districts participated with a random sample since the protocols had previously been distributed to multiple centers within the district.

No control is executed over the curriculum in private schools, nor the hours of attendance. By defining public preschool as those classrooms connected to the public school, no distinction was made between programs serving regular students, Title I students, or Early Childhood Special Education students, allowing for a simulation of the public Kindergarten classroom.

Delimitations.

Only schools using the DIAL-4 for screening purposes will be used in this study. Eighty-three school administrators were sent invitations to participate, but only eight returned information due to the timing and staff being near the end or beyond contract time. One consideration not dealt with is many of the public preschool programs are Title I or Early Childhood Special Education classrooms and may only serve those students with the greatest demonstrated need in prior screenings and or evaluations. Because of this special needs factor, the researcher anticipated that the results will be

lower than if there were separate categories for normal and special needs students.

Results of the intervention of attending preschool may also be apparent. Public Preschool participants covered a wide range of students. Some of the students were what would be considered normal while the majority were Title I or Early Childhood Special Education programs. That the mean scores of these combined programs were not significantly inadequate is a positive to the structure and opportunities afforded to these students.

Definition of Terms

At risk for school failure refers to factors associated with lower performance on measures of academic achievement. Children are often seen to be at-risk if they possess two or more of the following factors: they are English Language Learners (ELL), single parent family, mothers having less than a high school education, and low socio-economic condition. (Cappelloni, 2013).

Early learning standards are developmentally appropriate early childhood standards and performance expectations for preschool children's learning and development. These are implemented through informed practice in five domains: physical and motor, social and emotional, approaches toward learning, language and communication, and cognition and general knowledge (Cappelloni, 2013).

Formal Preschool Experience - when children attend a designated preschool program, complete with curriculum, such as private or public preschool or Head Start.

High-quality Preschool is a preschool program with high rating on evaluation in areas of child-teacher interactions, materials, activities, opportunities for learning, health and safety routines, adult-child ratio, classroom environment, the education and training with staff, and the relationships with the students' parents (Cappelloni, 2013).

Home only - children have been at home or in a daycare environment without formal preschool experience (Cappelloni, 2013).

Kindergarten screening is a non-evaluation tool used to assess the level of academic and social knowledge of a child prior to Kindergarten entrance (Mardell, 2011). For the purpose of this study, the screener will be limited to the use of the Developmental Indicators for the Assessment of Learning (DIAL-4). The areas of motor, concepts, and language will be compared, not just the total score.

Kindergarten readiness skills are specific skills, abilities and characteristics that preschool-age children demonstrate at the time of Kindergarten entry. These attributes fall within seven domains of early learning and development: physical well-being and motor development, social development, emotional development, approaches toward learning, language and communication development, emergent literacy, and cognitive development and general knowledge (Cappelloni, 2013).

Parents as Teachers - is a home visit program for prenatal to Kindergarten aged children emphasizing parent education and developmental knowledge and activities (Parents as Teachers National Center, 2015).

Preschool is a pre-Kindergarten program with academic emphasis. It may be a part of a school system, a church-based program, or privately run. Most are half-day programs and may or may not be accompanied by a child care program. The quality level of these programs varies widely based on curriculum, quality of instructors, and accreditation level (Cappelloni, 2013).

Preschool-age children or preschoolers include all children between the ages of three to five. This is regardless of whether they are in a prekindergarten program or not (Cappelloni, 2013).

Prekindergarten is any type of program that is publicly or privately funded for children between the ages of four and six preceding Kindergarten entry (Cappelloni, 2013).

Private Preschool - an organized program usually sponsored by a church or daycare facility (Ziglar, 2006, Cappelloni, 2013).

Public Preschool - an organized program associated with the public school (Ziglar, 2006). The school may have their own program or it may be a part of the Missouri Preschool Project grant program in Missouri.

Readiness skills are seen as the ability to communicate, be socially prepared to share and take turns, be enthusiastic and curious about participating in new activities while also being able to sit still and pay attention as agreed upon by parents and Kindergarten teachers (Collins, Hausken, West, 1995).

School readiness is a combination of preparedness among children, families, schools and communities (Missouri DESE, 2015).

The windows of opportunity for learning are wide open during early childhood. This is when the brain is most receptive to new experiences and learning. They do not begin to close until a child begins puberty, around twelve years of age (Sousa, 2011).

Young child is a child from birth to Kindergarten entrance. This includes infants, toddlers and preschool aged children (Barnet, 1998).

Summary

Children are arriving at Kindergarten with various levels of readiness skills that may be influenced by the early experiences and environments to which they are subjected commencing at birth and continuing to Kindergarten entrance. The variety of this exposure is becoming more and more evident. The windows of opportunity for learning are wide open during early childhood. These windows do not begin to close until a child begins puberty, around twelve years of age. (Sousa, 2011). The growth of the brain and the expansion of its circuitry begins within the first month after fertilization and grows exponentially during gestation and after birth. The experiences and environments that children are involved in will help to shape the brain. One of the common experiences most children have is a developmental screening prior to Kindergarten entrance. Results of early experiences will have either a positive or negative effect on the child's performance.

Comparison of the early experiences of young children with their scores on the DIAL-4 upon Kindergarten entrance will be the focus of this study. The early experiences considered include public preschool, private preschool, Head Start, and Parents as Teachers both alone and as a companion to classroom experiences. The student that is at home without outside agency involvement or formal preschool experience is in no way considered deprived of or lacking in positive experiences during early childhood.

Early childhood beliefs have changed over the centuries. Looking at the developmental theories of early childhood, its growth from how play was thought to be involved to the confirmation of current brain research. State early learning standards will

be compared and the manifestation of those standards into learning environments for young children.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

Beliefs and concepts of what and how children should learn have changed over the history of education. Chapter two presents the review of current literature as it relates to the progression of expectations for early childhood experiences, beginning with a historical timeline of the development of early childhood education and working into current theories and programs to support children's learning in their early years.

Expectations and treatment of children has changed over the centuries. As neuroscience harvests immense amounts of information concerning how the brain grows and learns, it often verifies the theories and observations of educators, doctors, and philosophers through the ages. Major changes in society and world accomplishments have also affected how we view the education of young children. In 2015 States are setting educational standards for young children before they commence formal education. Various institutions have been devised to assist parents in having their children ready for school including home visiting programs and various recognized preschool curriculum.

Following is a thematic view of the literature related to early experiences and children's learning. Beginning with the history of early childhood, it progresses through home visit programs, brain based learning, and school readiness, concluding with what an ideal early childhood education program would include.

History of Early Childhood Education

Expectations for young children in society have evolved from seen, but not heard to little adults to let them be kids to the current knowledge that the birth to Kindergarten

years are an age of extreme learning opportunities. In the Middle Ages, children were generally ignored until they reached adulthood. Babies were given to wet nurses upon birth. Poor children were fending for themselves on the streets at eight or nine years of age. The 17th century saw the beginning of the modern family, with families having their own homes and parents taking responsibility for their children (Wortham, 2002).

In 1000 AD, the Greek philosopher Plato saw play as an important part of a child's learning and their later roles in life. Word plays, ritual, music, gymnastics were all a part of Plato's education system. He then focused efforts on using this connection for educating children for their future professions (Dillon, 2004, D'Angour, 2013).

Martin Luther advocated for children learning to read in 1483 and promoted the idea of public education. He later emphasized the importance of children learning to read in their own language when he translated the Bible into German beginning with the New Testament in 1521 and concluded with the publishing of the Old Testament in 1532. Literacy is still a national concern today as evidenced by the many methods and emphasis placed on reading in schools (Funk and Wagnall, 2014).

The Renaissance revived an interest in classical and religious education. In 1592 Johann Amos Comenius wrote the first picture book for children. Comenius promoted learning through the senses and that learning should progress in a fashion of increasing difficulty. He devised a program of learning for young children through play, games, rhymes, fairy tales and manual activity. Comenius believed that all children should attend school without regard to social or sexual discrimination. Through the pictures in his books, Comenius wanted to arouse children's awareness and interested in learning and motivate them to continue with their schooling (Gundem, 1992). Comenius expected

children by the age of six to go to school for instruction in the three R's as well as religion, morals, and mechanical arts (Wortham, 2002). In 1628, Comenius developed the groundwork for modern grade schools by supporting the foundation of learning where each grade was built upon achieving success in the current one before progressing to the next. His concern was to have an order to all things, including education. Published in 1887, Comenius' *Orbit Pictus* presents the visible world in twenty chapters beginning with God and moving on to human's lives and ending with the Last Judgment (Wulf, 2002).

In the 1600's John Locke promoted the belief that children learn through their experiences, forming the basis of their learning. In 1632 he believed the experiences children had determined who they were and that teaching should begin early. By 1697, Locke had developed the Theory of Tabula Rosa - the mind is a blank slate. He believed the mind started as a blank slate and was filled by the experiences and environments that children are exposed to by caregivers. Researchers and neuroscientists now know that this is not entirely true, as the prenatal experiences can influence fetal brain development (Eliot, 2000).

The 1700's found an increased interest in children and how they learn. In 1712 Jean-Jacques Rousseau advocated a natural approach to child rearing. He believed a natural approach to educating young children worked best and suggested that children be free of swaddling and adult clothing and be allowed to eat, run and play as much as they wanted (Wortham, 2002). Rousseau believed children should be seen for themselves in education and not expected to only follow normative guidelines. He believed that the strengths that allow individuals to satisfy their own needs must be stimulated, that a

child's environment should be arranged with a view to their indirect education (Wulf, 2002). Rousseau was followed by Johann Heinrich Pestalozzi in 1746 who also advocated that children learn best with a natural approach and so developed object lessons where manipulatives such as counting blocks, measuring, and touching were used (Wortham, 2002). Pestalozzi took up Comenius' idea of order and developed a conception of elementary knowledge that has been a fundamental part of education ever since (Wulf, 2002). He also wrote two books on learning for mothers of young children to help them with teaching. Pestalozzi relied on children's natural instincts to motivate them in their learning. He advocated methods to look at children as individuals and to use natural objects and self-discovery (Wortham, 2002). In 1771 Robert Owen shared his belief that society can shape a child's character, and education can help build a new society and society can be reformed through early childhood education. In 1816, in New Lanark, Scotland, he founded a nursery school to supplement his cotton mills. This was an effort by Owen to rescue young children from exploitation and moral harm from child labor. Owen worried about the living and working condition of children and felt they should be protected. This was the first facility in Great Britain for the education of three to ten year old children. Owen's ideas on early childhood education were influential in Scotland, the British kingdom and spread to other nations (Burger, 2011).

In 1896, John Dewey founded the Laboratory School at the University of Chicago.

Dewey took advantage of early European educators such as Pestalozzi and Froebel to bring in play and learning by doing into his classrooms. Rather than sitting still and absorbing lectures, skills such as problem solving, language and math concepts were developed by children as they moved freely about the classroom and explored their

surroundings (Mooney, 2013). Dewey believed, as did Locke, Montessori and Piaget, that children learn by doing and should have education that involves real-life materials and experiences. He also argued that public education does more than impart academic skills, it is a vehicle for preparing children as future citizens in a diverse society. Dewey agreed with Montessori that the whole child is important, that intellectual growth will come with promoting imagination and social relationships (Zigler, Gilliam, Jones, 2006). This was truly child-centered teaching and learning. John Dewey's pragmatism theory of 1908 followed Montessori's research. Dewey emphasized an approach that built on the interests of children rather than subject matter. He believed that education was not the preparation for life, but rather that education was life (Mooney, 2013). One of his practical ways of teaching reading and math was through cooking. This famous educator had the ability to see the extraordinary value of everyday activities as learning experiences for children. Many of Dewey's principles are still used in today's schools. He believed that public education should be integrated regarding age and socio-economic status, as it prepares children to be future citizens in a diverse society (Zigler, Gilliam, Jones, 2006). Dewey's ideas of active and cooperative learning, and interdisciplinary projects is still included in educational trends. Current trends of networked distance learning and global corporate universities can be seen as conscious attempts to bring students into changing life-patterns. Dewey worked on the skills of an agricultural based society, today it is a global network society (Waks, 2013). This premise continues today with the idea of universal preschool for three and four year olds. It is believed that positive experiences at this age have helped to overcome the influences of poverty and neglect, such as is seen in Project Head Start. Maria Montessori continued with this

theory in 1907 as she pulled impoverished children off the streets and into her schools where they were successful learners (Mooney, 2013). This is supported by the results found in following Head Start students as they progressed through grade school.

Starting with the beliefs of Plato, play as the basis of young children's learning was the biggest step in views of early childhood education in the 1800's. Friedrich Wilhelm Froebel became the father of Kindergarten as he likened the teacher to a gardener and children as the seeds to be nourished and tended. Kindergarten translates to a garden of children. Froebel believed children learn best when play is the cornerstone of learning. Froebel compared children to tiny flowers: Each is a beautiful individual both alone and also in a community of its peers (Correia, Fisher, 2014). Froebel developed a curriculum emphasizing play for young children with a hands-on-learning approach that led to the development of a series of toys that would later be referred to as Froebel Gifts. In 1837 Froebel began his own Kindergarten with an approach to learning that was based on self-activities. Prior to this time, children under the age of seven did not attend school. Froebel incorporated songs, dances, and finger plays along with manipulatives into his Kindergarten program. He believed that play was the highest phase of child development. The Froebel Gifts emphasize progressive learning activities, each building on the other (Manning, 2005). This progression of learning is a companion to the thoughts of Pestalozzi, who he studied with before branching out to study on his own. Froebel had influence on early childhood education as we know it today. Children use manipulatives to construct knowledge as they learn through play (Manning, 2005). John Dewey praised Froebel for viewing a child's mind as an instrument of knowing and designing the gifts

and occupations that allowed children to construct knowledge by building on previous experiences. We still see his influence today in educational toys (Manning, 2005).

Maria Montessori, Italy's first female physician, believed that mental deficiency was more of an educational problem than a medical one. In 1907 she organized Children's House, a learning center based on materials, methods, and a child centered approach that is still active in over 4000 early childhood programs today. Montessori believed the classroom should provide objects for children to handle and explore, such as wooden cylinders, different textures of fabrics, gymnastics equipment and counting rods. Children are encouraged to explore these materials freely and work at their own pace. Montessori's theories about children and how they learn have influenced the way early childhood programs are designed today (Mooney, 2013). In the 4000 Montessori schools active today concrete materials will be found that offer individual, hands-on experiences. This includes live animals and/or models that can be used for classification as well as geography and biology. Maps, globes, puzzles, and solar system representation will also be found (McKenzie, Zascavage, 2012). What the teacher strives to do is plant seeds so children can care for and observe the plant growth, include children in snack preparation and serving and have three dimensional letters, shapes, and numbers that are covered with sandpaper so children can explore them and reinforce their learning visually and tactilely as well as orally. Montessori believed that first the senses must be educated, then the intellect. Her creation of a warm and comfortable learning environment, with independent and active learning was in direct conflict with the strict drill routines normally used at that time in overcrowded classrooms (Mooney, 2013). Montessori believed in individual, child directed activities that progressed from simple to complex

and from concrete to abstract materials. When they had mastered the current tasks, they would move on to more challenging projects. Collaboration with other children was encouraged, especially between younger and older students (Ansari and Winsler, 2014).

Early childhood growth and emphasis progressed in the 1900's. Jean Piaget's constructivist theory states children learn by doing and his stages of development are built on the skills of the previous stage. Piaget believed children are active builders of knowledge who construct their own theories of the world and this is done most effectively through active participation in their learning (Tyminski, 2006). Piaget began studying children as he worked on standardizing the Binet-Simon IQ test. He found children of different ages viewed and approached the world and learning differently. Piaget studied of Montessori's work and built on her idea that meaningful work is important in a child's cognitive development (Mooney, 2013). Piaget's continued interactions with children lasted his lifetime. He developed four stages of development that are still recognized today: sensorimotor, preoperational, concrete operational, and formal operational. These stages go from birth to adult years and are obtained progressively as children develop. Piaget saw development as a continuous progress, not one that was broken down into separate sections (Forman, 1993). Constance Kamii is still carrying on the constructivist work of her teacher, Piaget, with whom she studied for 15 years. Kamii specializes in mathematical concepts that can be learned through games as well as or in place of some more traditional methods (Kamii, 2014).

Lev Vygotsky (1896-1934), studied his contemporaries' Piaget and Montessori's work (Mooney, 2013). Vygotsky's Cultural-Historical Theory emphasizes the importance of interpersonal relationships in learning and social situations, brought us cooperative

learning as well as other social learning methods. Vygotsky opposed psychologists who believed children's development was spontaneous and not effected by education. He also opposed those who believed children could learn anything at any time (Mooney, 2013). Especially interested in children's cognitive and language development, Vygotsky believed learning could lead to development if it occurred within the child's Zone of Proximal Development (ZPD). Those skills on the verge of emergence are in the ZPD and will come forth if properly encouraged. If instruction is outside the child's ZPD, they will not learn it, no matter how it is presented (Mooney, 2013). One of the best ways for children to learn is through play. It is through play, Vygotsky believed, a child could reach their greatest achievements, with play being the preeminent early childhood educational activity. Through play, children would develop skills which would then become a foundation for later accomplishments, forming a connection between Vygotskian-type sociodramatic play to certain skills and abilities that relate to later success in school and life (Bredekamp, 2004). Vygotsky believed that the encouragement of social interactions and make-believe activities help a child's progress to abstract thought (Tyminski, 2006).

During the 1940s-1970s Erik Erikson brought the theory of psychosocial development into lifespan development proposing that cognitive development occurs in conjunction with social development. This also acknowledged that all children need predictable, consistent love, care, and education. With the ever changing world around them, students need to learn the process of searching for answers, not just learning fact through rote drill (Forman, 1993). Erikson believed early childhood years were critical in

a child's development of trust, autonomy, and initiative. These are seen as windows of opportunity or developmental timetables for first three stages (Mooney, 2013).

The National Association for the Education of Young Children (NAEYC) is a national membership organization whose primary function is to act on behalf of the needs and interest of young children. Providing developmental and educational resources to adults who work with children birth to eight years is the primary goal of NAEYC. This translates into sponsoring activities designed to improve the professional practice of early childhood educators and to educate the American public about the importance of good quality early childhood programs. One of the most ambitious projects of NAEYC is to help achieve its goal is its accreditation program (Benson, 2015). Accreditation standards are reflective of those standards developed by various states across the nation (Gronlund, 2006). Founded in 1926, this ongoing organization's purpose is to promote appropriate education and care of young children. The association continues to educate and advocate for young children today through over 100,000 members and more than 400 affiliates nationwide. Research and accreditation of programs are also vital parts of providing for the education of those that work with young children. Information is provided through books, pamphlets, journals, videos, conferences and an extensive article archive. Informational materials explain the theorists and theories behind today's developmentally appropriate practices (NAEYC, 2015).

The launch of the Russian satellite Sputnik in 1958 instigated development of the National Defense Education Act (NDEA) during the Eisenhower administration. The federal government first became involved in curriculum development through NDEA influence. (Steeves, Bernhardt, Burns, Lombard, 2009). The focus of this act is that the

best defense is a good education. Funding for science, technology, math, engineering and foreign language education is provided through NDEA. The current Science Technology Engineering Math (STEM) education emphasis is an ongoing continuation of federal involvement in school curriculums resulting from the launch of Sputnik and the race for space. The NDEA was followed by *A Nation at Risk* in 1983 and *No Child Left Behind* (NCLB) in 2001 (Steeves, et al 2009) calling attention to needs in American education. The National Science Foundation coined the term STEM in the 1990s as a way to express the importance of science, technology, engineering, and math (Cunningham, Higgins, 2014). Young children begin experimenting and learning basic engineering and physics when they play with blocks and other materials to solve problems such as building houses, bridges, and ramps. These open-ended activities lead to exploration, learning through failure, working together, and persistence to solution (Cunningham, 2014). Many students lose interest at an early age in science and mathematics, making an early exit from STEM education. Integrative STEM education pedagogy has basis in constructivist practice, is inherently learner-centered and knowledge-centered (Sanders, 2009). As more is learned about how children acquire knowledge, the beliefs of Vygostkey and Piaget that children learn best through play are verified. The maker movement, where students tinker with objects to make an article that will perform a task or solve a problem, serves as a motivating, engrossing introduction to scientific principles. The maker movement also has deep roots in the instructional practices of Dewey, Froebel, and Montessori (Bevan, Petrich, and Wilkinson, 2015). These are a few of the ways for children to benefit from the brain's open windows for dendrite development. When children enter Kindergarten behind their age group, they will have an almost impossible time catching

up with their better prepared peers. Early childhood is the place to take advantage of the rapid brain development and cognitive growth that are established in these open windows of opportunity for learning math, science, and technology skills (Zigler, et al, 2006).

The Civil Rights Act of 1964 caused the United States government to be more involved in ensuring an education for all in response to the civil rights movement. This act protects the rights of all individuals in public facilities, including schools. This was later amended with Title IX, which also provides equality between genders in sports activities. The Coleman Report in 1966 reported that minority races were one to two years behind white students in first grade. By 12th grade, this gap was widening from three to five years (Wortham, 2002). This equal opportunity legislation extended into the preschool arena with the Head Start program.

In 1965 the Federal Government under the Johnson administration and through the Department of Health and Human Services began the Head Start program. A tea party in the Rose Garden given by the First Lady for the Head Start planning committee gave an aura of respectability to the new program as Lady Bird Johnson launched her role as national spokesperson (Hinitz, 2014). This free program provides preschool educational experiences to low-income three and four year olds. It also includes children who are at-risk and with disabilities. Up to ten percent of a classroom may include non-qualifying students to serve as peer examples. The requirements for teaching in a Head Start classroom continues to evolve and is moving toward requiring certified teachers. In fiscal year 2013, Head Start employed 250,000 staff members. During the 2007 Head Start re-authorization under President George H. Bush, a national goal was set for 50 percent of the Head Start teachers to hold a Baccalaureate degree or higher in early childhood

education. Sixty-six percent of the teachers held a Baccalaureate degree or higher in early childhood education or a related field with experience in 2013 (U.S. Department of Health and Human Services, 2014). Head Start utilizes a whole child approach, placing value on emotional, social, health, nutritional and psychological needs of students (Blank, 2010). Parents and other volunteers are actively involved in the Head Start program, as parent education is a major component. The current staff has 23 percent of its members that began with the program as parents. In Fiscal Year 2013 there were 932,164 three and four year old children served by the Head Start program. With growth based on federal funding appropriations, this program has seen over 40 percent growth from its original 561,000 enrollment in 1965 (USDHHS, 2014). Children's school readiness is measured by domains of language and literacy, cognition and general knowledge, approaches to learning, physical development and health, as well as social and emotional development. These goals are achieved through a comprehensive combination of education, screenings, health services, nutrition, and family involvement with goal setting (USDHHS, 2014). This comprehensive child development program has served over 21 million children since 1965 as our nation's foremost federally funded provider of educational experiences for young children in poverty (Barnett, Hustedt, 2005).

Early Head Start was added in 1995 to expand services for families prenatally to three years old and their families (Barnet, Hustedt, 2005). Information, social service connections, and resource access are important components of this program. As children turn three, they are reassigned to the local Head Start or other early childhood program for future attendance. Both of these programs support the mental, social and emotional development of children within their programs. Funds for Early Head start programs

support two generations, usually mothers, infants and toddlers. Health information and education is available to low-income pregnant mothers as well as those with young children (Aaron, 2011). The Early Head Start is more home based, intensive, continuous and comprehensive than the program for older children. There is a socialization component in the program for the benefit and learning of both parent and child. Fiscal year 2013 saw 150,100 children served. The service model is based on the needs of the community. Approximately 12 percent of the population served qualifies for special educational services under the Individuals with Disabilities Education Act (USDHHS, 2014).

The Individuals with Disabilities Education Act (IDEA) governs how states and public agencies provide special intervention, education, and related services to children with at least one of 13 specified categories of disability between the ages of birth and 21 years. This law was signed into being in June, 1975 and replaced PL94-142 or the Education of All Handicapped Children Act of 1975 (Aaron, 2011). This act was important in requiring all handicapped children be evaluated for their strengths and weaknesses. From this, an Individual Education Plan (IEP) was developed. This IEP is developed in cooperation with the specialists that serve the student such as diagnosticians, psychologists, teachers, therapists, and parents. It defines the goals for the students and the least restrictive setting in which they may be achieved. This can vary from mainstreaming in the regular classroom to a separate specialized classroom. PL99-457 amended the Education of the Handicapped Act in 1986, establishing a comprehensive program of early intervention for children from birth to three. It also

strengthened the requirements for services to three to five year old children (Wortham, 2002).

With the increase in two working parents and the mobility of society, the National Association For Family Child Care (NAFCC) was established in 1982. The mission of the NAFCC is to promote quality child care by strengthening the profession of family care providers for children. This was followed by the 1990 Child Care and Development Block Grant which is the main source of U.S. federal money for supporting child care for low-income families. Over 1.8 million children receive benefits of this grant monthly, improving the quality of care and environments they receive. This program has undergone revision since its enactment. It currently assists low-income families, families receiving temporary public assistance and those transitioning from public assistance in obtaining and paying for child care so they can work or attend education or training courses (Aaron, 2011).

Title I, Part B saw the emergence of Even Start in 1988. This federal program integrates early childhood education for socially disadvantaged parents with children from birth to seven years. The adult education and the early learning component are addressed through family literacy programs (Aaron, 2011).

President George H.W. Bush signed the No Child Left Behind act in 2001. This supports standards-based education reform. It is based on the idea that setting high standards, milestones, and goals can help to improve the education of individuals. An offshoot of this Act is the Common Core State Standards, striving to have the same goals in place across the United States. This Act also promotes the use of Title I, Part A funds for pre-school programs as it recognizes the importance of preparing children to be ready

to enter school with appropriate language, cognitive and early reading skills such as book handling and listening. The early Reading First program of 2002 extends the NCLB goals in programs for preschools. Also in 2002, Special Education preschool grants and state grants became a part of IDEA (Individuals with Disabilities Education Act) for preschool students ages three to five. This was then expanded in 2007 to include children birth to two with disabilities through IDEA, Part C (Aaron, 2011).

Missouri and Early Childhood Education

Missouri has long been a proponent of developmental programs for young children. The first public school to offer Kindergarten in the United States was in St. Louis, Missouri. Founded by Susan Blow in 1873, she worked to bring Kindergarten beyond the socially economic elite as seen in the private institutions on the east coast. Blow's beliefs about the value of early childhood education were established during a family European tour where she became acquainted with the work of Friedrich Froebel. St. Louis Public Kindergarten, originally targeting 68 children from the slum of the Des Peres neighborhood, grew to nearly 9000 students during the eleven years Blow directed the program (Shepley, 2008).

As Early Childhood came to the forefront both nationally and internationally in the 1980s, Missouri followed the federal initiatives and went on to produce their own project. Mildred Winters, then director of the Early Childhood section of the Department of Elementary and Secondary Education (DESE) saw the need for a one on one child development program for the families of Missouri. Four home visiting pilot programs, under the title of Parents As First Teachers, began in 1980. These pilots involved families from multiple socio-economic backgrounds, as well as those from rural and urban areas.

The results of the pilot programs showed that the participating students not only were better prepared for Kindergarten than like matched peers, but the improvement continued through third grade with the administration of the state-wide Missouri Assessment Program (MAP) achievement test (Pfannenstiel, Zigler, 2006).

In 1984 the Missouri Legislature passed Senate Bill 658, the Early Childhood Development Act, with bi-partisan support under the leadership of then Gov. Christopher "Kit" Bond. Senate Bill 658 provided for each school district in the State of Missouri to provide the Parents as Teachers (PAT) home visiting program, as well as screening services, for children and their parents prior to Kindergarten entrance. The PAT program provides developmental information and activities appropriate to the child's stage of development. The opportunity to meet and interact with other parents in the school district was achieved through group meetings on various topics of developmental interest. Parents as Teachers, currently based in St. Louis, Missouri, has been replicated in all 50 states and is growing in more than seven foreign countries and four American territories (DESE, 2005). World-wide, families are learning more about their child's development, how to encourage learning, and what is needed for Kindergarten. Zigler et al estimates that between 30 and 40 percent of children enter Kindergarten unprepared (Zigler, Gillam, Jones, 2006).

A group of early childhood teachers gathered in 1986 at Commissioner of Education Arthur Mallory's home. The objective was to write a new curriculum for early childhood in Missouri. The result was the Project Construct Framework. This document was based on the constructivist philosophy of learning by doing. It uses the students' interest to motivate learning, encourages collaboration and working together, allows

children to take the initiative, express opinions and make choices. Children's errors are viewed as learning opportunities, allowing them to think as well as work. Teachers set high expectations for their students, as well as providing a rich learning environment (Project Construct, 2014). Reviewing the goals and objectives for early childhood, they formed the basis for the Missouri Early Learning Standards within their curriculum. Since the curriculum is more play/project oriented, it addresses the objectives with suggestions for activities.

In 1998, the Missouri Legislature approved House Bill 1549, the Missouri Preschool Project (MPP). Lead by then director of DESE Early Childhood Ruth Flynn, this competitive grant program was to provide materials, training, and salaries to school districts in order to start preschool programs where there was the greatest need. Funds were used to reach out to the communities served by the school districts where it was awarded. Programs were to assist in the furtherance of quality in Head Start programs, childcare, and/or family daycare facilities with training, materials, and interaction among the leaders of these programs. Fees for this program were to be set by the districts, but must be on a sliding scale based on free and reduced lunch guidelines. In order to assure quality programs, each site was to meet child care licensing requirements and begin the accreditation process, either for state or national accreditation. Curriculum choices were given between Missouri's Project Construct, Creative Curriculum or the High Scope project. These guidelines allowed choice for the local district as well as working toward high quality programs for three and four year olds. The first group of awardees was announced in March, 1999. Programs began that fall (MO DESE, 2015). In January, 2000, then Governor Mel Carnahan selected Lamar R-1's Tiger Preschool to represent the

ideal implementation of MPP in his final State of the State address. As he held one of the students, Governor Carnahan emphasized the vital importance of providing learning opportunities to all of Missouri's young citizens as he closed his address:

Tiger Pre-School serves 20 children in the morning and 20 children in the afternoon and collaborates with the local Head Start Program to provide services to an addition 10 children...

Tiger Preschool is one of the first new facilities to be established, thanks to House bill 1519, which expanded our state's early childhood and education programs ... Ladies and gentlemen, here is our future. In these eyes rests the vision of dreams unseen. In these hands lie achievements yet to be realized. And in these hearts burns the hope of a better Missouri to come. May the Almighty guide our words and deeds in the days ahead as we go about our business preparing the way for Missouri's children by opening doors to a new century.

(Carnahan, 2000)

The first set of Missouri Preschool Standards was developed to establish a foundation to merge into the Missouri Grade Level Expectations (GLEs). These standards were written corresponding to developmental areas by committees of early childhood practitioners from different areas of the State and various arenas of specialties. Early learning standards from other states and national early childhood leaders were examined for consistency and format. At the conclusion, there was a set of expectations for birth to three year olds and another for three to five year olds. Each set had three different publications. The first publication showed the standards, objectives,

and indicators. The next was prepared for teachers with appropriate activities to support achievement of the indicators in the classroom written by the Missouri Project Construct National Center staff. The third section was focused on parents. Activities prepared by Parents as Teachers National Center staff were directed toward normal family experiences. With the advent of the Common Core State Standards, the GLEs were revised into Learning Standards, so the early childhood standards have also been adapted to continue to prepare children for the Kindergarten objectives. The accompanying teacher and parent guides and are known as the Missouri Early Learning Standards (MELS). These publications are available on the Missouri Department of Elementary and Secondary Education (DESE) website, are ready for free download to all who are working with young children (MO DESE, 2015).

Missouri has a goal to be ranked among the top ten states educationally by 2020. Referred to by DESE as Top 10 by 20 Missouri Proud, this program is a major improvement effort that has the aim of increased student achievement. Of the four goals, number two is of special interest to the early childhood community.

"Goal 2: All Missouri children will enter Kindergarten prepared to be successful in school" (Missouri DESE, 2014). The first objective under this goal involves increasing by two percent the number of young children birth to Kindergarten entry who participate in health and developmental screenings, families that receive parent education through visits by a parent educator, and the parent education visits with high needs families. This two percent increase in each area is as an annual increase. The second objective also includes a two percent annual growth in the number of programs for infants, toddlers and preschoolers that meet established high quality standards (Missouri DESE, 2014).

Strategies in place to achieve this goal of school readiness begins by making information available to families and community stakeholders about the accessibility of services for health and developmental screenings as well as the parent education programs of Parents as Teachers and First Steps' birth to three special education services. To make this plan a reality, school boards and central office personnel will be informed about the availability and benefits of such programs and work with them on accessing funding for improvement and expansion especially among high needs families. The information distribution will continue by not only emphasizing the need for high quality programs for young children, but also how to recognize, implement and fund those programs. To increase the incidence of expected growth in high quality programs, the strategy calls for dissemination of the Missouri Early Learning Standard (MELS) as well as professional development on how to incorporate the MELS successfully into existing as well as new programs (Missouri DESE, 2014).

As states continue to work toward having students prepared to learn as they enter Kindergarten, defining what is expected in readiness skills is important. Researching how children in various environments, specifically childcare, private preschool, Head Start and public school settings, perform on Kindergarten readiness screenings will be beneficial to those developing curriculums, social and academic expectations in addition to budgets involved with early learning.

In 2013, the United States Congress was called upon to expand access to quality preschool to all children. The Preschool for All Initiative was proposed by President Barack Obama as he stated "I propose working with states to make high-quality preschool available to every child in America. ... Let's do what works, and make sure

none of our children start the race of life already behind. Let's give our kids that chance" (Obama, 2013, np).

Home Visit Programs

Reaching out to new parents is a growing component of early childhood education. The foremost delivery system of early intervention is the home visitation program. It is estimated between 400,000 and 500,000 children receive service each year. Beginning at birth, parents' involvement in the education of their children can help to buffer poverty's threats to children acquiring language, cognitive, and social skills that help with achievement in elementary school (Manz, P., Gernhart, A. L., Bracaliello, C. B., Pressimone, V.J., and Eisenberg, R.A., 2014). The first three years of life are critical in the life a child and its parents. During this time attachment and positive relationships are formed. A reduction in the event of abuse and neglect as measured by emergency room visits has been documented. Home visitation has shown to be an effective mode for the delivery of services prenatally as well as during infancy/toddlerhood (Daro, 2014). Researchers have only begun to examine the key dimensions of the helping relationship of home visiting in relation to early childhood. These programs are unique, in that they are primarily voluntary for parents and the preventative interventions are focused on the children, rather than an identified problem (Korfmacher, J., Green, B, Spellmann, M., and Thornburg, K.R., 2007). Home visiting programs involving toddlers through Kindergarten entrance are showing positive results. Participating children enter Kindergarten with at least three factors that pertain to later academic success: social competency, parent involvement, and early literacy. Longitudinal follow up on these students shows positive effects on school achievement, lower dropout rates and a higher

graduation rate. One of the advantages of services being provided to families is that transportation issues that could prohibit families from participating in programs for their children are eliminated. Transportation issues are seen as a powerful indicator that the family is deserving of support and attention. With services being provided in the home, the overall process of parent involvement and connecting with programs is enhanced, as the parent is then the host, with the service provider being a guest in the home. With parents agreeing to have services in the home, it indicated they value what is being offered to them and their children (Korfmacher, et al, 2007). Studies also show that home visiting that begins prenatally and lasts to Kindergarten generates even stronger positive outcomes (Daro, 2014). Vygotsky believed cognitive development is an interaction between children and their social development. Home visiting programs help parents improve the social environment of their child by an emphasis on supporting parenting skills. By enhancing parent-child interaction the child will be successful at constructing their knowledge, gradually lessening their dependence on parental support as they master the concepts (Schull, Anderson, 2008).

Home Instruction for Parents of Preschool Youngsters (HIPPY) is a home visiting program developed in 1969 at the National Council of Jewish Women Research Institute for Innovation in Education, located at Hebrew University in Israel. Evidence that early childhood intervention could help children from low-income families be better prepared to enter school stimulated the program's creation to assist immigrant children in avoiding low educational achievement (Baker, Piotrkowski, Gunn, 1999). In 1984, HIPPY was set in motion in the United States. It began operations in Arkansas, Michigan, and New York with more than 120 programs. Children's development is recognized by HIPPY as being

powerfully effected by the family (Baker et al, 1999) and focuses on parent-involved early learning. Hillary and Bill Clinton introduced HIPPI to Arkansas in 1986 and promoted its development as governor to the extent that half of U.S. programs are in Arkansas (Baker, Piotrkowski, 1996). Services are offered directly to parents, who then work with their three to five year old children. Role modeling is the service delivery method. Visitors are from the community and supervised by a professional. The target population is parents who have doubts about or lack of confidence in their ability to prepare their children for school entrance. Participants frequently did not finish high school or only have limited formal education. Some are English Language Learners, and most have limited financial resources or other accepted risk factors. Distinct features of the HIPPI model include a developmentally appropriate curriculum, weekly home visits of one hour each plus monthly group meetings, role play as the instructional model and a local staffing structure. Effectiveness of the program has shown favorable results in English language usage (USDHHS, 2014).

Early Head Start is a nationwide home visiting program for prenatal to two year olds begun in 1995. Qualifying families are low-income and two generations are served: mothers or mothers to be, and their infants and toddlers under three (Aaron, 2011). The goals of Early Head Start are to provide safe and developmentally enriching care giving for young children. The enrichment centers on physical, cognitive, social and emotional growth and development to prepare children for future growth. Supporting the parents, both mother and father, in the role as care givers and teachers of their children is a major focus. Home visitors help parents set and meet personal goals for their family. Early Head Start works with communities to provide the help and support these families need.

To bring this about, Early Head Start ensures the staff is highly qualified and trained to provide these services to families (USDHHS, 2014).

Designed to nurture healthy attachment between child and parent, Early Head Start emphasizes a strength-based model that employs an emphasis on high quality and promotes healthy activities with prevention of possible delays by stressing positive relationships and continuity with the involved parents. Periodic screenings are administered to children since as many as one in four children through the age of five are at risk for developmental delay or disability (Administration for Children and Families, 2014). The culture of the family is important to the success of the Early Head Start program. When measuring the satisfaction of parents with their Early Head Start program in a national study, it was found that the mother's reported relationship with the home visitor was a strong indicator of her satisfaction and participation in the program (Korfmacher, et al, 2007). By understanding where the family comes from, home visitors are able to deliver a comprehensive program that has the flexibility and responsiveness to keep services going even when families are on the move. Collaboration with other agencies, communication with parents, and generally caring about the families allows this accomplishment. Home visitors also assist with transition into local Head Start programs as the child turns three (USDHHS, 2014). Results of a long-term study of Early Head Start children found at the age of two years old children with at least one year of EHS performed better on measures of cognitive, language and socio-emotional development than did their peers who had not participated. At three years, the EHS children continued to outperform the control group. With the two generational emphasis in EHS, it was also found the parents of EHS children performed better on measures of the home

environment, parenting, and knowledge of child development. The parents were more likely to participate in job training and education and to be employed (Schmidt, Ewen, 2012).

Early Head Start programs provide 90 minute visits with the parents and child on a weekly basis. If there is more than one child in the home, an additional visit is added per week. Also provided are twice monthly socials, where parents and children have the opportunity to interact with their peers. During these times, information on health, development, and the domains of learning are interspersed with parenting skills. Socials may be conducted in association with other early learning programs, such as Parents as Teachers (USDHHS, 2014).

Nearly 2000 local Parents as Teachers programs in all 50 states and Canada serve approximately 250,000 children each year (PATNC, 2015). This is an evidence based, federally recognized voluntary program for children prenatally through Kindergarten entrance. Certified parent educators work to help parents improve their parenting practices and knowledge of child development. Periodic screenings are used to help detect any developmental delays and health issues, prevent child abuse and neglect and increase school readiness in participating children (Hippert, 2014). Parents as Teachers began in 1984 in Missouri, is the only state in the nation to statutorily mandate that each school district provide parent education and family support systems (DESE, 2005).

Early childhood family education is important because all children are born with the same number of brain cells and if the brain isn't nourished with rich environmental stimuli and good nutrition it will not develop to its full potential. Parents as Teachers is essential to this type of family growth and knowledge based on the knowledge that babies

are born learning and parents are a child's first and most influential teacher (Cohen, 1997).

The effect of the Parents as Teachers program on children's academic achievement has been an ongoing study by Zigler and Pfannenstiel. In 2002 Ziglar and Pfannenstiel published a study showing that Parents as Teachers had both direct and indirect effects on children's school success. The length of participation directly and positively impacts school readiness, home literacy activity, and preschool participation. It is also a predictor of third grade achievement on the Missouri Assessment Program communication arts test. Long participation in Parents as Teachers also influences school readiness, which then predicts a significantly reduced likelihood of the students having an Individual Education Plan at third grade (Zigler and Pfannenstiel, 2002).

Research by Zigler and Pfannenstiel (2007) showed participation in Parents as Teachers alone, or in combination with other preschool services can increase a child's learning aptitude regardless of social economic status. The research showed 82 percent of children living in poverty that participated in Parents as Teachers and preschool with an intensity of two years of PAT and one of preschool entered Kindergarten more ready to learn than those who had not been involved with either service. This Kindergarten readiness was not restricted to those children in poverty. The higher income children showed a 93 percent readiness for Kindergarten with the same intensity of participation. In addition, the third grade scores on the Missouri Achievement Program communication test were again higher for those children who had participated in Parents as Teachers and/or preschool than those who did not have those experiences (Pfannenstiel, Zigler, 2006).

Former Missouri Governor Mel Carnahan made it a priority to provide developmental outreach during the first three years of life to Missouri's children. One of the major offerings is developmental screenings for all children under the age of two. Brain research confirms that the early detections and treatment of delays are critical to proper child development (Cohen, 1997). Through the development of early childhood programs such as Parents as Teachers, Missouri Preschool Project, Early Head Start, Head Start, First Steps and Early Childhood Special Education, Missouri continues to implement Susan Blow's vision of improving learning environments for all young children.

How the Brain Learns

"It is striking how the accumulated scientific research since the early 1990s supports theories of learning from educational and psychological visionaries, such as ... Lev Vygotsky, Jean Piaget, John Dewey...and others" (Willis, 2010, p. 46). It is agreed between medical and educational experts that the first two or three years of a child's life is when the brain is developing at a speed that will never be experienced again in its lifetime (Sousa, 2011). Marcus E. Raichle of the Washington University School of Medicine states "The shift in neuroscience research from looking primarily at the damaged brain to putting together an owner's manual for the normal brain will have tremendous benefits for the educational world" (Cohen, 1997, page 11). *Experience-dependent synaptogenesis* is perhaps the most relevant brain function discovery for schools and communities. This explains and clarifies how neural connections, or synapsis, are developed by learning experiences. In other words, the brain is changeable, or plastic. (Wilson, D., Conyers, M., and Rose, K., 2015). The reorganization, or

neuroplasticity, of the brain continues with the input that it receives from home and school. How the neural circuits are shaped will determine what the brain learns during those years and later in life. (Sousa, 2011).

Brains are most sensitive to experience early in life. The human brain at birth is in an amazingly unfinished state. While the hardware is present, the connections have yet to be made. Children's experience in the world result in connections and these are reinforced by repeated experiences (Schiller, 2008). The experiences, both positive and negative, in the early years represent the most unique and valuable opportunity to support a child's environment and proactively promote healthy development. Intelligence is not fixed at birth. Amassed data indicate that experiential and environmental factors contribute greatly to how intelligence is formed (Wilson, et al, 2015). The National Scientific Council on the Developing Child in 2007 found considerable linkage between a child's physical and social environments and their developing brains and behaviors. The effects on the brain begin at the molecular level with microscopic interaction between neurons and can grow to complex systems through the nervous system. The quality of early social interactions and the childhood environment influence the experience-dependent shaping of high level brain functions (Sripada, 2012). The importance of developing and implementing a positive child-centered curriculum and learning environment appropriate for young children receives support from combined principles from constructivism and research in the neuroscience field (Rushton, Juola-Rushton, 2008).

Brain development during the prenatal period is influenced by the outside world. Maternal nutrition, habits, stress, disease, or addictions all play a role. Almost all of a baby's estimated 100 billion neurons are formed in the prenatal period. It is estimated

approximately twice as many neurons are produced as will survive to adulthood. Some of the connecting synapses do form during the latter part of the pregnancy. After the child is born, the individual's experiences with the environment play a critical role in the continuing connection forming between the billions of neurons produced during the prenatal period. A child's brain will experience its most rapid growth in the first year. The first birthday finds a brain twice the size it was at birth (Twardosz, 2012).

Brains of young children expand rapidly. It is estimated by the time a child reaches the age of five, there will be more than 100 billion neurons that have made connections to the grey matter, or cerebral cortex of the brain. If these neurons are not used, they will die out. Neurons are initially overproduced so that brain development can continue through life. Learning language, increasing mobility, and talking are connected to the neurons in the brain establishing strong, healthy connections. The stronger the connections between neurons, the stronger and faster the reactions will be in recalling information (Rushton, 2013).

Armstrong (2006) points out that by the age of three a child's brain is functioning at twice the speed of the adult brain. This young child has an abundance of dendrites, the connections between neurons in the brain are undergoing the process of pruning which is where the neural connections are reinforced or discarded, depending on the experiences and types of stimulation a child experiences or does not experience in their environment. During the first three years of a child's life, the young brain will actually double the number of synapses through which electrically fired impulses connect the dendrites to approximately 1,000 trillion connections. This is many more than will be in the adult brain. The extra synaptic connections provide a clue as to how experience shapes the

brain (Hall, 2007). Myelination is the process by which the axons in the nervous system are sheathed, or insulated, to allow greater and more efficient passage of electrical impulses to the brain. The early brain development points to the importance of a child's early surroundings, both emotional and social as well as learning. Play can be critical in promoting healthy neurological development. Children should be exposed to dynamic, creative and multisensory experiences in a safe, supportive environment (Sousa, 2011).

Cohen believes action needs to be taken to disseminate knowledge about brain research and the implications to parents, educators, child care providers, and other stakeholders. Since both heredity and environment matter in a child's brain development, the greatest impact can be made through the environment (Cohen, 1997). Understanding by parents, educators and caregivers about how brain plasticity effects developmental intelligence and believing that children can get smarter is essential (Wilson, et al, 2015). During the first few years of a child's life the brain is expanding and developing rapidly. The brain requires external stimulation to promote healthy growth. Each new learning experience encourages the growth of dendrites that connect the neurons of the brain. With repeated exposure to experiences, the myelin sheath that surrounds the axon portion of the dendrites increases. The more complex the learning experiences, the thicker the myelin sheath and the more hardwired the brain becomes on that topic (Rushton, Eitelgeorge, Zickafoose, 2003). Children need to be immersed in real life, hands-on, meaningful learning experiences. These experiences should be intertwined with commonality and also require some form of problems solving to nurture the neuron connections (Rushton, 2013).

Teachers have lacked knowledge of how the brain functions for centuries. The mechanical means has been invented that can monitor the activities of the living brain, allowing the development of educational neuroscience. This occurs with the intersection of psychology, neuroscience, and pedagogy (Sousa, 2011). Psychology involves the study of mental processes that are responsible for cognition and behavior, it is the study of the mind. Pedagogy is the art and science of teaching, the study of education. The study of the brain's development, structure, and function is the realm of neuroscience. Educational Neuroscience combines these three areas of science in the study of the mind, how the brain develops, and how this effects education (Sousa, 2011).

Constructivist educators such as Piaget and Vygotsky believed children learn best by doing (Rushton, et al, 2009) and that children's brains need to be immersed in real-life, hands-on experiences that provide meaningful learning experiences (Rushton, 2011) such as described by Montessori. Utilizing the traditional project approach to integrate children's learning across subject areas (Spodek, Saracho, 2003) and the immersion of students in a whole-language classroom allows the use of a great variety of texts, genres, and opportunity to see and experience language (Rushton, et al, 2003).

Brain-Based Learning (BBL) involves techniques gleaned from research in neurology and cognitive science that are used to enhance teacher instruction. Brain Based Learning is gathered from the combined work of neurologists, biologist, psychologists, educators, and physicians. Professionals then extrapolate the current research date on the brain and apply it to teaching and learning. Two of the twelve main principles of BBL that contribute to this discussion are that learning is developmental and learning is enhanced by challenge and inhibited by threat. Children, and their brains, benefit from

enriched home and school environments where they feel safe and supported (Connell, 2009).

Some of the brain-based strategies that those educators with extensive early childhood training steeped in brain-based learning incorporate include:

- a. Immersing the child in meaningful learning experiences,
- b. The use of play as a tool for gaining experience for primary age students,
- c. Cooperative learning and active learning for elementary grade students, and
- d. A curriculum that respects multiple intelligences.

These practices fall under the umbrella of constructivism.

(Rushton, Juola-Rushton, 2008, pp 87-88).

Looking more in-depth at the four brain-based strategies quoted by the Rushtons (2008) it can be seen that immersing the child in meaningful learning experiences allows the brain to process new information by making sense and meaning of the material. For material to have meaning, children need to know it has relevance for them. Ways of doing this include using tapping into their prior knowledge, using graphic organizers, providing hands-on practice, and having time to reflect on what has been presented (Schiller, 2008).

The use of play as a tool for gaining experience for primary age students is most effective as guided play, even though much is learned through free play. Guided play is where the adult sets the stage and the child takes control of when and what is done. Both have the child as not only an active participant, but also the leader. The adults can continue to guide the play beyond providing the environment with questions such as "What do you think would happen if.." gently nudging the child toward the objective. If

you guide children through play, they will learn better than if you tell them what they are to learn (Weisberg, D.S., Kittredge, A.K., Hirsch-Pasek, K., Golinkoff, R. M., and Kishr, D., 2015).

Cooperative learning and active learning for elementary grade students allows students to collaborate with each other, especially in project oriented classes. Through collaboration, children share their knowledge and ideas. They support each other as they engage in complex activities or coordinate on the next step in a joint project. These opportunities allow students to see the problem from another's perspective and expand their own opportunities to teach and learn. Working with others allows children to enjoy a challenging task longer and more (Wohlwend, K., and Pepler, K., 2015).

A curriculum that respects multiple intelligences respects the differences in children and how they learn. With the brain's plasticity, it has the ability to form and strengthen connections with repeated exposure. By using multi-sensory learning experiences, the stimulation promotes the growth of more connections in the brain between the dendrites and also more myelination. Each sense of the brain has its own compartmental storage area. With greater stimulation, more areas of the brain are utilized. Activities that utilize multiple senses, multiple ways of learning, allow the brain to duplicate the storage of information and have greater recall (Willis, 2010).

Although the brain's capacity for learning has not changed, the environments in which it exists has. Changes in the world by the industrial revolution were major and now increasing information technology makes a difference that is ongoing in speed and innovations. The brain can respond to all of these changes. These developments will have an impact on the teaching and learning endeavors. The young brain has great potential,

but not much skill and will gravitate toward and select certain skills to which is exposed (Cohen, 1997).

School Readiness

School readiness is defined by specific skills, abilities and characteristics that preschool-age children demonstrate at the time of Kindergarten entry. These attributes fall within seven domains of early learning and development: physical well-being and motor development, social development, emotional development, approaches toward learning, language and communication development, emergent literacy, and cognitive development and general knowledge (Cappelloni, 2013).

Over 4 million children enter the nation's public and private Kindergartens each year (Cappelloni, 2013). Incoming Kindergarteners begin school with considerable variation in their range of skills, general knowledge, and abilities. There is an increasing diversity of ethnic, racial, cultural, social, economic, and language backgrounds. They also differ enormously in their early care and educational experiences prior to Kindergarten (Cappelloni, 2013). The importance of school readiness has been shown to be a predictor of later school success. A child's readiness skills and success in school can be traced back to and associated with multiple factors and early childhood educational experiences in preschool, family characteristics, and other influences in the years prior to Kindergarten (Sousa, 2011). Young children have an impressive capacity for learning in these years as is shown by recent advances in the ability to monitor brain function and knowledge of early brain development (Cappelloni, 2013, Sousa, 2011).

According the Missouri Department of Elementary and Secondary Education (DESE, 2014) school readiness is a combination that involves children, families, schools

and communities. School readiness for children means being prepared in the key dimensions of early learning and development: social and emotional, language and literacy, cognitive, motor, health and physical well being, and positive attitudes and behaviors toward learning (DESE, 2014). Periodic developmental screening is helpful in assisting children to achieve these developmental milestones. Brain research confirms that the early detections and treatment of delays are critical to proper child development (Cohen, 1997). Children should enter Kindergarten ready to learn by being healthy, have adequate hearing and vision or adaptations in place. They should be able to get along with others and have skills in language and motor skills. A child that has a positive attitude and deep curiosity about many subjects will be ready to adapt to Kindergarten routines (Zigler, Gilliam, and Jones, 2006).

Families having an understanding of their child's current level of development, how to encourage them, and ready to develop a supportive relationship with their child's school are considered to be Kindergarten ready. Fully believing that children are their child's first and most important teacher, parental involvement with their child's learning does not end with Kindergarten entrance (DESE, 2013).

Providing a welcoming and accepting environment that is ready to accept all students and their families is an element of Kindergarten readiness for schools. Having professional educators who are constantly aware of the growth of their students, working to advance student growth in partnership with families as well as advance their own professional growth through reflective practice. This readiness for communities means supporting schools and families. The readiness of communities also involves valuing the critical role of early learning in their community. This can be by supporting library story

hours, preschools, and providing programs that are accessible and involve families with young children (DESE, 2013).

"All children must possess the foundational language arts knowledge necessary to explore, comprehend, and discuss topical concepts in all content areas if they are to succeed academically" (Bracken, Crawford, 2010, p 421). State learning standards have an emphasis on language and cognitive domains of development. The importance of vocabulary development in young children, especially those at risk for academic failure, is supported in literature (Bracken, et al, 2010). Continuing neuroscience research supports healthy development in all domains of early development are important in preparing for Kindergarten. The social and emotional development of the child has a high correlation with their learning and school academic success. High quality early childhood education can nurture all domains of development: physical, social, emotional, language, and intellectual (Cappelloni, 2013). A knowledge of basic concepts is a greater predictor of both reading and mathematical abilities than the traditional vocabulary tests. These traits proceed over a developmental sequence. Concept development is seen as an undergirding for literacy development among preschool age children. Being able to connect novel words around their conceptual development allowed them to do better in establishing word meanings (Bracken, et al, 2010).

Standards of readiness vary from state to state, even though the same domains are accepted as the standard areas of development to emphasize. Plans also vary from coast to coast and in the mid-west of the United States. Some of the States look at their early learning standards from the point of the child, others the teacher. The National Head Start learning standards address the same domains.

Missouri refers to their birth to Kindergarten standards as Missouri Early Learning Standards (MELS). In order to directly correlate with the Common Core Standards, the original project has been updated (DESE, 2015). Domains with elements of knowledge are the format for the National Head Start learning standards that are used across the nation. Compliance is monitored by review committees of Head Start staff and parents on a routine schedule. Programs also have to meet state childcare licensing criteria each year (Hinitz, 2014).

Washington State approaches Kindergarten readiness from the perspective of the child. Their short, generalized list emphasizes social interactions and self-care that are important in the Kindergarten classroom. In 2006, Governor Christine Gregoire signed a bill for more cohesive and integrated voluntary learning system for Washington. The policy change focused on birth to age six, including transition into Kindergarten. The research on the growing brain, both prenatally and in childhood provided support for actively involving parents in child care and education (Sripada, 2012).

Early Learning Standards, according to the Early Childhood Education Assessment Consortium of the Council of Chief State School Officers are:

Statements that describe expectations for the learning and development of young children across the domains of: health and physical well being; social and emotional well-being; approaches to learning; language development and symbol systems; and general knowledge about the world around them (Gronlund, 2006, pp 2, Schiller, Willis, 2008, pp 52).

Most states have similar Early Learning Standards. Under physical science MELS notes the child "Explores physical properties of objects and materials" and other states with a

similar standard include California, District of Columbia, Georgia, Illinois, Indiana, Louisiana, Maryland, Maine, Minnesota, New Jersey, Ohio, Oklahoma, Rhode Island, Texas, and Utah (Gronlund, 2006, pp 66).

Examination of learning standards for young children shows similarities and differences between coastal states, the heartland, and nation-wide programs. Using Missouri Early Learning Standards (MELS) as the basis for comparison, we see that National Head Start Standards are comparable in the domains of Literacy, Mathematics, Science, Physical Development, Health and Safety, as well as the Social-Emotional and Approaches to Learning. Head Start is not quite as specific in these areas, however they are included. When examining Arkansas's Readiness checklist, readers will see that it has emphasis on self-help, literacy, and rote mathematics where the MELS and Head Start stress usage and application of knowledge in literacy, mathematics, science, and social-emotional skills. Looking only at Virginia's Social-Emotional Foundation Blocks for Early Learning it is apparent there is a greater emphasis on self-control, interaction with others and their own self-concept. In contrast, Washington State's readiness objectives are written from a child's point of view, emphasizing knowledge of self, care of self such as toileting, gross motor skills, and being able to work with others.

Ideal Early Childhood Education

"Teachers are, after all, the ultimate 'brain changers.' They are in a profession of changing the human brain every day" (Sousa, 2010. p 23). Teachers set the environment that children experience in a preschool setting. The children should be able to interact freely with the different learning centers in the room. Each center should be designed to stimulate and intrigue children of all temperaments and approaches to learning. The rapid

growth in the minds of young children inspires them to explore, to discover, and play as they make the natural connections between self, others, and their surrounding world (Rushton, Juola-Rushton, Lewis, 2009). First and foremost, the children should be in a safe environment. A child's safety and well-being must come before anything else (Schiller, 2008).

Children's play is one of the best methods by which children can achieve the development requirements of readiness for school. Play is dynamic, an ever changing process by which the dendrites in the brain can be used in a multitude of fashions through multi-sensory, creative, interactive, and imaginative activities (Armstrong, 2006). At the Roseville Community Preschool in Roseville, California, the school rules are to run, jump, dig, explore, talk, build, tear down, pour, yell saw, hammer, paint, ride, imagine, sing, wonder, measure, ponder, play, be alone, examine, experiment, express, daydream (Armstrong, 2006). This freedom to explore and learn should be the basis for the ideal preschool experience. Space, atmosphere, curriculum and resources available to children significantly influence their autonomy to learn and grow.

According to the Missouri Department Elementary and Secondary Education (DESE, 2015) in their Missouri Preschool Project guidelines a minimum of 50 square feet of open space for each child in the classroom should be allotted, with a maximum of 20 children. This is in addition to classroom storage space. Illinois suggests 40 square feet per child, with an additional 15-20 square feet for items such as cabinetry and countertops, cubbies, closets and other fixed elements of the room (Illinois Facility Fund, 2004). Tables, chairs, sinks and restrooms should be child sized for easy access. A variety of learning centers should be available both indoors and outdoors. Outdoor play

areas should have at least 100 square feet of space for each child to encourage active play. One thousand square feet of floor space is not the total aspect of an adequate classroom. Is the space well organized, with open pathways that lead to activities and allow children to manage on their own (Colbert, 2008)? When analyzing the space with regard to windows, doors, bulletin boards, electric outlets, water sources, bathrooms, entryways and accessibility to the outdoors one should ask how can the space be used? What is the lighting situation - natural or only artificial? How can areas of learning be rotated or combined to increase interaction among students and project work? The combination of many elements lend to the overall atmosphere of the classroom (Wurm, 2005).

Children and parents look forward to coming to school when the atmosphere is child-friendly and welcoming (National Association for the Education of Young Children, 2015). The early childhood classroom should be friendly and welcoming to parents and children. Displays of children's work is important in stimulating conversations not only between parent and child, but also between parent and teacher. Parent involvement at the school is an important factor in children's learning. The child centered classroom will have informal learning going on all the time. There will be open-ended play, moving and learning most of the time with lots of unstructured play time. Children will choose their own activities and have extended time periods to manipulate, explore, and draw conclusions about their projects. Lots of multisensory experiences and materials are more important than high-tech devices (Armstrong, 2006).

Complexity and variety provide children measures of interest in learning through play. Variety refers to the differences in the type of activity the children can choose to do

in the center (Colbert, 2008). Supporting the domains of child development, the preschool classroom will have many materials to encourage early literacy, language, and communication. Included by not limited to, paper for writing and art, colored markers, crayons, pencils, chalk boards with chalk and erasers, whiteboards with dry-erase pens and erasers. Books of many kinds will be in the library corner and throughout the centers of the classroom. The books should include concepts, rhyming, poetry, fairy tales, non-fiction, informational, and fiction. Music will be available to listen to in various genre, as well as there being assorted instruments for child-generated music (Armstrong, 2006, Gronlund, 2006). Play units developed with these materials include simple play units, with one obvious use such as tricycles; complex play units will have different materials juxtaposed to allow children to manipulate and improvise as with a home living center with shopping materials; and super play units are a complex unity with one or more additional play materials, such as dough and tools (Colbert, 2008).

Physical motor development will be encouraged by the use of equipment and materials for two subgroups: large motor and sensorimotor skills. Encouraging large motor skills would be large blocks, bikes, balls, scooters, mats, climbing structures, jump ropes, comes, bean bags, ramps, hula hoops, sandbox, water table, parachutes, etcetera. Fine motor skills are promoted by Legos, small blocks, clay, glue, scissors, sewing cards, jacks, spray bottles, clothes pins, paint brushes, chalk, tweezers, tongs, basters, eye droppers, hole punches, etc Motor skills can be encouraged indoors and outside (Armstrong, 2006, Gronlund, 2006).

Social and emotional development are enhanced though creative/dramatic play with props for different environments such as school, home, office, restaurant, post

office, store, and other role playing experiences. The art center will have a wide assortment of materials available for self-expression and creativity. Board games for two or more players encourage the social skills as the children learn to play memory games and bingo. Materials for helping to develop cognitive and general knowledge include many different kinds of puzzles, concept and non-fiction books, various kinds and sizes of blocks, objects to sort, order, count, and pattern; mathematical manipulatives and a science center with live insects, fish, and animals as well as plants, rocks, and shells (Cappelloni, 2013).

These experiences and materials are not limited to the indoor classroom. Outdoor areas are conducive to exploration of textures, sounds, large projects, and drama in addition to running, climbing, swinging, twirling, riding, and ball playing. Outdoor centers for painting, playing music, watching plants grow and water flow are all important in the lives of children (Wurm, 2005). Direct access to outdoor play areas is important. Children need a place to expend their energy. The outdoor play area should be organized for running, climbing, sliding, riding tricycles, or other similar activities. It should also provide opportunities for exploring, observing nature or planting, imaginative play and interacting quietly with others. Separate zones for different types of activities are important. A patio type area is beneficial for messy/wet play incorporating sand and water (Illinois Facilities Fund, 2004).

Summary

Environments young children are exposed to and experience are crucial for optimum development of their brains. The windows of learning opportunity are wide open and ready to assimilate knowledge well before a child darkens the Kindergarten

doorway. It is up to parents, family, caregivers and the community to provide appropriate opportunities for all children. The role of children in society has changed since the early days of Plato. Theories of how children learn are varied, but none deny nor dispute the importance of the early childhood years. Technology has made it possible to document the brain's growth and what stimulates that development. It confirms the theorists' beliefs and adds fuel to the continued advancement of parent involvement and the value of stimulating environments.

Comparison of children's scores on the DIAL-4 prior to Kindergarten entrance will be made with regard to early experiences prior to screening. Involvement in formal educational programs, home visiting programs, no formal program and combinations thereof will be made based on information gathered from eight Southwest Missouri schools.

CHAPTER THREE

METHODOLOGY

Introduction

The national education Goal #1 developed by President George H.W. Bush and the 50 state governors states children will arrive at school ready to learn. The National Education Goals Panel (NEGP) established that a child's readiness for school is a collaborative process with three main factors: availability of high quality programs, parent participation and support and the child's physical and mental health (Cappelloni, 2013). As a part of Missouri's Top 10 by 20 campaign Goal #2 states all Missouri children will enter Kindergarten prepared to be successful in school (Missouri Department of Elementary and Secondary Education, 2012). Developmental screening of children about to enter Kindergarten serves as an indicator of a child's readiness to learn.

Participants / Population

Data was collected from eight Southwest Missouri schools that are incorporating the DIAL-4 as their prekindergarten screener. Via e-mail, 83 administrators were asked to participate in the Early Experiences and Kindergarten Readiness survey (Appendix A) concerning students that would be entering Kindergarten the 2014-15 school year.

Information collected addressed the questions:

1. Is there a statistically significant relationship between early childhood experiences and overall performance on the DIAL -4?
2. Is there a statistically significant relationship between early childhood experiences and performance on individual areas of the DIAL 4?

3. Does gender play a role in school readiness?

Participants indicated the early experiences their children have accessed since birth, in particular Parents as Teachers and the type, if any, of formal preschool instruction. This information, plus the child's chronological age and gender, were inserted in an excel form along with their Total, Motor, Concepts, and Language area scores (Appendix B). This sheet was returned either through e-mail or printed copy through the United States Postal Service.

The researcher has been involved with early childhood locally, regionally, and state-wide for 28 years both as a participant and instructor. Experience has defined home with no formal schooling means that the child has either been home with parents or in a childcare environment without a formal preschool program. Private preschool experiences are those that are received through an organization, many church based, with at least a semi-formal learning environment. Many parochial bodies have a preschool program at least two days a week. Some of the group childcare centers also offer a preschool program. Public preschool is that which is offered by the public school, either as a component of their overall educational offerings or a part of a grant programs such as the Missouri Preschool Project. Also included in public school opportunities are Title I and Early Childhood Special Education programs. A state approved curriculum is implemented in these situations. Head Start is the federal preschool program whose curriculum is guided by the National Head Start Standards Participation in the Parents as Teachers home visiting program will be made. Also being examined will be if the child only participated in PAT or also in a private, public, or Head Start preschool offering. Since the comparison is being made between early experiences and Kindergarten

readiness, ethnicity and social economic standard of the student and family will not be considered.

Physical settings where developmental screenings are held vary from site to site. Screening may be conducted one on one in the home, at an early childhood center, in the school building or other facility. Screenings are often conducted in a mass setting, where the screening tool may be administered by multiple personnel. The unifying factor is all children must be five years old prior to August 1 of the year they are enrolling in Kindergarten. For this study, the children must be five before August 1, 2015.

Eight schools (see Appendix C) chose to participate in the Early Experiences and Kindergarten Readiness Survey. This involved 542 students that were entering Kindergarten in the 2015-2016 school year. It should be noted that one school contributed 42 per cent of the sample. Appendix C lists participating schools and the number of students recorded. Participation required secretarial time and possible copier time for printing the results to complete the data base.

Sampling Procedures

An electronic letter was submitted to superintendents and early childhood directors in schools located in southwest Missouri on May20, 2015. Attached to the letter was the excel database for submitting information (Appendix B). Results acquired using the DIAL-4 screener were utilized in this analysis. A reminder letter was sent to the 83 administrators on June 1, 2015.

Research Design

Having been involved in Kindergarten Screening for 28 years, the researcher is interested in how early experiences affect the results of Kindergarten screening. The

current instrument designated as appropriate and reimbursable in Missouri is the DIAL-4. Districts in Southwest Missouri were invited to participate in the survey. Results were electronically mailed, delivered by USPS, or collected in person with district personnel from the school districts. No distinction will be made due to race, ethnic origin or socio-economic levels of students whose information is included in the study. Following the administration of the DIAL-4 screening instrument, results not only from the Total score, but also those from the sub-areas of Motor, Concepts, and Language, and gender will be compared with the early experiences information gathered from the parents at the time of screening. Main points that were examined are no formal schooling verses preschool/Head Start, Parents as Teachers, preschool/Head Start only contrasted with preschool/ Head Start with Parents as Teachers.

Instrumentation

Southwest Missouri school administrators of Kindergarten programs were surveyed to determine if their programs were eligible for participation in the Early Experiences and Kindergarten Readiness Survey. To be eligible to participate in this study, a district had to use the DIAL-4 screening instrument.

The survey contained inquiry into whether the DIAL-4 was used as the Kindergarten Screening instrument, willingness to include information regarding the experiences of children prior to screening, and the excel database that would be completed with the students' performance numbers from the screening. Programs that choose to participate were asked to insert information on the data base. The student names were removed to conceal the identity of the student.

Developmental Indicators for the Assessment of Learning (DIAL-4) was the Kindergarten screening instrument used in the study. This instrument is approved by the Missouri DESE for use in screening three to six year olds and is widely used by school districts in Southwest Missouri.

Reliability and Validity of Instrument

Information concerning the reliability and validity of the screening instrument were taken from *Dial-4 Developmental Indicators for the Assessment of Learning, Fourth Edition Manual* by Carol Mardell, PhD and Dorothea S. Goldenberg, PhD in cooperation with the publisher, Pearson Clinical Assessments, San Antonio, Texas, in 2011.

Reliability.

"Reliability is the degree to which an assessment tool produces stable and consistent results" (Phelan and Wren, 2006, p.1). Two types of reliability measures were utilized in the evaluation of the DIAL-4, internal consistency and test-retest reliability. Internal consistency reliability is used to assess the degree to which items for an area or score measure the same underlying construct. Test-retest reliability is the method used to determine how consistent test scores are over relatively brief periods of time (Mardell, 2011, p53).

Internal consistency reliability coefficients within subtests were used to describe how well the items measured the same ability or skill, such as language skills. The internal consistency reliability coefficients were determined by a split-half test by age. With 200 participants in each of seven six month age ranges, the mean coefficient in motor was 0.84, in concepts 0.92, in language 0.93, with a total mean of 0.95. These scores were based on the sums of weighted scores in each area (Mardell, 2011).

Test-retest stability is determined by comparison of scores taken far enough apart for little item retention, but close enough that little or no developmental advances have occurred. It is expected that the second score should be slightly higher than the first. For the DIAL-4, 49 students from ages two years, six months to three years, eleven months were retested, with a standard difference of scores in the four areas ranging from 0.14 to 0.17, with the reliability r ranging from 0.63 to 0.80. Forty-four students in the four year, zero month to five years, eleven months age range showed a standard difference in motor of 0.27, concepts 0.28, language 0.33 with total being 0.41. A reliability r of 0.64, 0.73, 0.84 and 0.81, respectively, were based on the standard deviation obtained in the first administration of the DIAL-4 (Mardell, 2011, p. 57). More test growth was seen in the older age group as could be expected with many of them being in a school setting. The overall reliability of the DIAL-4 was found to be adequate to good in stability.

Validity.

"Validity refers to how well a test measures what it is purported to measure" (Phelan and Wren, 2006, p. 3). Evidence for a valid application of a test includes the previous versions, the updated versions, and research that evaluated the utility of the new measure in a variety of clinical context. This process is ongoing throughout the life of the test (Mardell, 2011, p. 59).

Construct validity is used to show that the items tested accurately measure what is meant to be measured. It was found, as hypothesized, that the motor area did not have a significant amount of intercorrelation to the other areas. Motor to concepts was 0.49 and to language the correlation was 0.44. The correlation between language and concepts

was 0.68, with the total correlation ranging from 0.74 to 0.88 based on 1,400 participants with a mean score of 100 and a standard deviation of 14.7 to 15.2 points (Mardell, 2011).

Comparison with several other early childhood measures were conducted, including the Developmental Indicators for the Assessment of Learning, Third Edition (DIAL-3), Early Screening Profiles (ESP), Battelle Developmental Inventory, Second Edition (BDI-2), Differential Ability Scales, Second Edition (DAS-II), and Vineland-II Adaptive Behavior Scales (Mardell, 2011).

Since the DIAL-4 is a revision of the DIAL-3 it was expected to have strong positive correlations. The actual correlations were moderately high. Concepts had the highest correlation with 0.84, language was moderate with 0.75 and motor was the lowest with 0.58. The motor area experienced the greatest number of changes, so a difference in scores was expected (Mardell, 2011).

Compared to the ESP, the DIAL-4 correlations lent support for the construct validity of the revised instrument. DIAL-4 concepts and language areas were compared to the ESP cognitive/language profile with a correlation of 0.59 and 0.61. The motor areas had a low correlation of 0.21 as the tasks differ considerably (Mardell, 2011).

A low to moderate correlation was found between the BDI-2 and the DIAL-4, with the total scores showing one of the strongest correlation at 0.61. Language and Communication items had a 0.63 score, indicating a strong correlation. These results were very similar to those obtained between the DIAL-3 and the BDI-2, further supporting the construct validity of the DIAL-4 (Mardell, 2011).

High correlation was found with the DAS-II, especially in the concepts area at 0.71. Language was also high, with 0.61 correlation. Motor scores were low, as the

DAS-II has an absence of gross motor skills and minimal fine motor skill tasks compared with the DIAL-4. Correlation comparison with the Vineland-II dealt mainly with the teacher and parent questionnaires of the DIAL-4 (Mardell, 2011). Strong correlations were found, but do not pertain to the areas of this study.

Characteristics of sample.

In establishing reliability and validity of the 4th edition of the Developmental Indicators for the Assessment of Learning (DIAL-4), 224 operators were used to test 1,574 children from the age of two years, six months to five years, eleven months of age at the time of administration. The sample of children included 942 completing the English version, with the Spanish version being given to 650 children. Approximately 25 percent of the children were from each of these socio-economic conditions as grouped by parent education: less than a high school diploma, high school diploma or GED, some college, and college degree. Samples were made from all four regions of the United States -Northeast, Midwest, South, and West (Mardell, 2011, p.33).

Each item was performed for the preliminary estimates of reliability and validity. Those items were then analyzed for difficulty and how effective they were at differentiating among those examined with different ability levels. The most effective were retained. These items also underwent a series of differential item functions (DIF) analyses to compare different groups of children: female/male, White/African American, and Hispanic/White. Identical items were also examined to compare the English and Spanish versions of the DIAL-4. Any item or task with a DIF value of 0.5 logits or higher were discarded from the test (Mardell, 2011). Standard deviations for each area

were established. The initial tasks with an item had at least a 50 percent pass rate, with most being 70 percent.

To obtain a nationally representative sample of children required standardization. This was done to establish the reliability of the DIAL-4 as a tool for identifying children who were at risk for school failure (Mardell, 2011, p34). The standardization sample included English- and Spanish-speaking children. These children lived in the United States or Puerto Rico and were selected from ages two years, six months to five years, eleven months old. They were divided into nine groups with the youngest year divided into two month intervals and those from three years, six months placed in groups with a six month range. Other factors in their selection included sex, race/ethnicity, region, and SES level (Mardell, 2011, p34). Also taken into consideration were other factors that might affect performance on the DIAL-4, such as premature birth, parent drug use before birth, and low birth weight in all, 1400 children participated in the norm sampling process. As part of the norming, standardization process percentiles charts and standard deviation numbers were developed for a standard expectation of areas of readiness and potential delays.

Statistical Treatment of Data

Databases from participating schools were combined for analysis using the Statistical Package for the Social Sciences (SPSS), one-way Analysis of Variance (ANOVA), t-test, and Tukey's Honestly Significant Difference (HSD). The scaled scores requested on the database were converted to nationally normed percentiles, thus eliminating age differences. Sorting was done by percentile scores, with those total scores under the 40th percentile considered Not Ready for Kindergarten. Motor, concepts, and

language areas were examined to determine the overall area most inadequate in preparation for Kindergarten. Additional sorting was done by categories of early experiences: Parents as Teachers, private preschool, Head Start, and/or public preschool. Comparisons were made with the resulting categorical percentiles.

Independent variables of formal preschool/Head Start experience, Parents as Teachers participation, combined preschool/Head Start and Parents as Teacher, and no experience with any of these early experiences were combined with the dependent variables of the scores in the areas of Motor, Concept, and Language as well as the Total score using ANOVA methods to assess if there is a significant difference between the early experiences and the Kindergarten screening scores. Gender readiness comparisons in the areas of Motor, Concepts, Language and Total were analyzed through the application of a *t*-test.

Rationale for Selected Statistical Treatment

Early experiences have an effect on young children and how they will perform on a screening instrument. Because of the multiple variables being examined, an Analysis of Variance (ANOVA) were used for determining the statistical significance of the independent variables on the dependent variables. An ANOVA is used when more than one independent variable (IV) has two or more dependent variables (DV) to assess which DV is effected the most by the IV. This eliminates the error factor of using multiple *t*-tests to look for statistical significance.

The independent variables (IV) to be examined are

1. Gender
2. No formal schooling

3. Public preschool
4. Private preschool
5. Head Start
6. Parents as Teachers
7. Preschool/Head Start with Parents as Teachers

Different variables may affect areas in diverse manners. Using the DIAL-4, the dependent variables are the four components measured with the DIAL-4

1. Total Score
2. Motor
3. Concepts
4. Language

A 0.05 level of significance will be set for this study.

Summary

Experiences children have during early childhood may affect their readiness to begin formal schooling with public Kindergarten. Developmental screening prior to Kindergarten entrance will give an indication of how ready a child is to be successful in school in the areas of motor, concepts, and language. By comparing the screening results with generalized early experiences, conclusions will be drawn to determine if there are significant reasons to invest supplementary funds in an assortment of early childhood experiences.

Following the receipt of information on Kindergarten screenings, the analysis of data using the SPSS, ANOVA, and *t*-test were conducted and discussed. These results were then examined and used to examine the areas of early childhood development that

need the most improvement to assist children in reaching the status of ready for Kindergarten.

CHAPTER FOUR

ANALYSIS OF DATA

Introduction

Of the 83 requests for response only eight districts in Southwest Missouri responded to the call for information regarding district Kindergarten screen results using the DIAL-4. The request for information was distributed electronically to 83 school district administrators. Initial mailing was May 20, 2015, with a follow-up letter on June 1, 2015. Timing of the distribution may have been a factor in the response rate due to end of school activities, information previously sent to receiving schools within the district, and personnel having completed contract hours. Districts responding to the request for information varied in size from one with only eleven students to one with 224 students which composed 42 percent of the analysis database. Two of the larger schools had already distributed screening information to their various attendance centers chose to contribute random samples, one with approximately one percent of their population, the other with twenty percent.

Descriptors

Data was processed by means of IBM SPSS Statistics program, utilizing ANOVA and post hoc tests and Tukey test to make comparisons between the groups of students and their performance in the three areas of the DIAL-4 as well as the total score. Percentile scores compensated for the actuality that some of the larger districts screen children for Kindergarten throughout the school year, rather than in a mass screening annually. Percentiles are based on both performance and age, indicating how performance compares to peer groups of the same age achieving the same score. A

percentile score of 50 indicated that the child did as well as or better than 50 out of 100 students performing the same task at the same age.

Reviewing students performing at the 40th percentile or lower in individual as well as total areas of the DIAL-4 was accomplished by simple sorting and counting of percentile scores. Also examined were the students scoring at the 95th percentile or higher and the early experiences that were reported. Title I remedial programs use the 40th percentile as a starting point for service needs for students, while on standard IQ testing the 95th percentile is utilized as the beginning point for gifted designation. Students who fall between the 41st and 94th percentile are considered in the normal to average range.

Descriptive Statistics

Five hundred forty-two results were collected from eight different Southwest Missouri public schools. Of this sample, 281 were male and 261 were female. No home visiting program or formal educational experience was recorded by 132 students. Experience with one of the surveyed programs numbered 225, public preschool, private preschool, or Head Start. Parents as Teachers, plus one of the three formal preschool experiences, had 182 indicated participants. Only three students participated in all three activities: Public Preschool, Head Start, and Parents as Teachers, these were excluded from the study due to small number. Of the 410 students reporting participation in the studied programs, 243 were in public preschool, 52 in a private preschool, 57 in Head Start, and 246 participated in the Parents as Teachers program

Table 1. Student Participants

Total division of participants in each category:

No formal early educational experience	132
Public Preschool only	91
Private Preschool only	32
Head Start only	38
Parents as Teachers only	66
Public Preschool and PAT	146
Private Preschool and PAT	20
Head Start and PAT	14
Public Preschool, Head Start, and PAT	3

Three responses indicated participation in three of the studied programs: public preschool, Head Start, and Parents as Teachers. The limitations of the study only allowed for participation in one or two early experiences, so these three were eliminated.

Determination of potential readiness for Kindergarten based on percentiles showed 153, or 29 percent of the students, had a total DIAL-4 score at or below the 40th percentile mark. Of these, 45 also scored below 10 percent, indicating a need for intervention. On the other end of the spectrum 54 students, 10 percent, scored at the 95th percentile or higher indicating extreme readiness.

Inferential Statistics.

Table 2 Inferential Statistics by Mean Scores

Experience	Number of Students	Total Mean Score
No formal early educational experience	132	58.6
Public Preschool only	91	57.8
Private Preschool only	32	59.7
Head Start only	38	48.4
Parents as Teachers only	66	51.7
Public Preschool and PAT	146	64.9
Private Preschool and PAT	20	77.2
Head Start and PAT	14	60.6

Examination of the divisions of the participants, shows that approximately 25 percent, or 132 of the students have no formal early educational experiences, while almost half of them have participated in a Parents as Teachers program. This leaves 25 percent only having some type of formal preschool experience. Mean scores based on the total percentile of each group gives the impression that participation in the Parents as Teacher program makes a positive difference in the early experiences of young children.

Examination shows no difference in the total performance of children on the DIAL-4, regardless of their formal or informal early experiences. The mean scores on the DIAL-4 range from 48.4 to 58.6. One consideration that has not been dealt with is that many of the public preschool programs are Title I or Early Childhood Special Education classroom and may only serve those students with the greatest demonstrated need in prior screenings and or evaluations. These students are included in the public preschool designation, as well as tuition paying students and Missouri Preschool Project students

Parents as Teachers. The mean scores raise from 7.1 to 17.5 points with the addition of PAT.

In general readiness, almost a third of the students entering kindergarten could be seen as not ready due to their total scores on the DIAL-4, while ten percent could be considered very well prepared. Dividing the readiness into the three areas of the DIAL-4 of Motor, Concepts and Language, the not ready indicator of the 40th percentile was lower in the Motor area (27 percent) which includes gross and fine motor tasks. Concepts, covering colors, numbers, shapes and sorting saw an increase to 36 percent not ready while Language's articulation, letter/sound recognition, vocabulary and problem solving had the highest deficiency at 30 percent. The top range of scores showed the highest marks in Motor with 12 percent, Concepts five percent, and language four percent. Inspection of the reported early experiences consistently showed that the combination of public preschool and Parents as Teachers was present in the majority of the students scoring at the top of distribution.

Data Analysis

Utilizing a significance indicator of 0.05, comparisons were made in the DIAL-4 mean percentile score within the areas of Motor, Concept, Language and Total. The groups compared by the ANOVA with post-hoc Tukey were those with no formal experiences, public preschool, private preschool, Head Start, Parents as Teachers, public preschool with PAT, private preschool with PAT, Head Start with PAT.

Table 3. Comparison of Motor Mean Scores

Experience	Number of Students	Total Mean Score
No formal early educational experience	132	58.20
Public Preschool only	91	60.73
Private Preschool only	32	59.31
Head Start only	38	35.34
Parents as Teachers only	66	61.79
Public Preschool and PAT	146	66.21
Private Preschool and PAT	20	70.30
Head Start and PAT	14	67.29

Motor skills covered in the DIAL-4 include gross motor activities requiring balance and control which include directed throwing, hopping, and skipping. Fine motor skills include block building, dexterity, cutting, writing with a pencil. No distinction is made between these areas, all are considered part of the 35 point scaled score used to calculate the percentile. Mean scores in this area ranged from 35.34 for Head Start to 70.30 for Private Preschool. Overall mean for the motor area is 59.9.

Table 4. Motor Significance as determined by ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32219.683	7	4602.812	5.109	.000
Within Groups	478382.361	531	900.908		
Total	510602.045	538			

The ANOVA for the motor area of the DIAL-4 showed no significant variance within each group. There is a significant variance between groups of the independent variable, so the Tukey test was completed to determine where the significant variance was found.

Table 5. Head Start Motor Tukey Significance

Group	Significance (0.05)
No Formal Experience	0.001
Public Preschool	0.001
Private Preschool	0.021
Parents as Teachers	0.001
Public Preschool +PAT	0.001
Private Preschool + PAT	0.001
Head Start + PAT	0.016

Statistical significance greater than 0.05 in the motor area is seen between Head Start only and all of the other early experiences surveyed, with Head Start being significantly lower than the other areas.

Table 6. Comparison of Concept Mean Scores

Group	Number	Mean Score
No Formal Experience	132	52.67
Public Preschool	91	52.96
Private Preschool	32	47.28
Head Start	38	38.84
Parents as Teachers	66	42.14
Public Preschool +PAT	146	55.86
Private Preschool + PAT	20	63.00
Head Start + PAT	14	48.14

Concepts covered by the DIAL-4 include body parts, colors, rapid picture identification (pre-reading skill), numbers and counting, comparison concepts, and shape identification with sorting. There is no weighted difference between these areas, all are considered part of the 35 point scaled score used to calculate the percentile. Mean scores in this area ranged from 38.84 for Head Start to 63 for Private Preschool plus Parents as Teachers. Overall mean for the concept area is 50.11.

Table 7. Concepts Significance as determined by ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18371.976	7	2624.568	3.035	.004
Within Groups	459173.085	531	864.733		
Total	477545.061	538			

The ANOVA for the concept area of the DIAL-4 showed no significant variance within each group. There is a significant variance between groups of the independent variable, so the Tukey test was completed to determine where the significant variance was found.

Table 8. Concept Significance between Public Preschool with PAT as determined by Tukey

Group	Significance (0.05)
Head Start	0.033
Parents as Teachers	0.037

Statistical significance in the Concept area is seen between Public Preschool with Parents as Teachers compared to Head Start alone and Parents as Teachers alone, with the significance of combination of programs being 0.033 and 0.037 respectively.

Table 9. Comparison of Language Mean Scores

Group	Number	Mean Score
No Formal Experience	132	49.84
Public Preschool	91	50.07
Private Preschool	32	53.53
Head Start	38	31.97
Parents as Teachers	66	47.82
Public Preschool +PAT	146	54.96
Private Preschool + PAT	20	67.90
Head Start + PAT	14	52.29

Language skills covered by the DIAL-4 are inclusive of personal knowledge, articulation, nouns, verbs, alphabet recognition and sounds, rhyming, initial consonant application, and problem solving. There is no significant difference is made between these areas, all are considered part of the 35 point scaled score used to calculate the percentile. Mean scores in this area ranged from 31.97 for Head Start to 67.90 for Private Preschool plus Parents as Teachers. Overall mean for the motor area is 51.05.

Table 10. Language Significance as determined by ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	22864.415	7	3266.345	3.802	.000
Within Groups	456158.435	531	859.055		
Total	479022.850	538			

The ANOVA for the language area of the DIAL-4 showed no significant variance within each group. There is a significant variance between groups of the independent variable, so the Tukey test was completed to determine where the significant variance was found.

Table 11. Head Start Language Significance as determined by Tukey

Group	Significance (0.05)
No Formal Experience	0.022
Public Preschool	0.032
Private Preschool	0.047
Public Preschool +PAT	0.001
Private Preschool + PAT	0.001

Statistical significance in the Language area is seen between Head Start and all areas except Parents as Teachers alone and Head Start with Parents as Teachers. Comparison with no formal experience, public preschool, private preschool and the preschools combined with Parents as Teachers all showed a significantly higher score in the language area.

While looking at the individual areas of Motor, Concepts, and Language show the significant differences in the children who participated in different programs, the Total score will give an overall gauge of Kindergarten readiness in participants.

Table 12. Total Mean

Group	Number	Mean Score
No Formal Experience	132	58.61
Public Preschool	91	57.85
Private Preschool	32	59.72
Head Start	38	48.37
Parents as Teachers	66	51.70
Public Preschool +PAT	146	64.89
Private Preschool + PAT	20	77.20
Head Start + PAT	14	58.00

The total score percentile is achieved by adding the raw scores of the three areas motor, concepts, language into which the DIAL-R is divided. There is no weighted difference between these areas, all are considered part of the 105 point scaled score used to calculate the percentile. Mean scores in the total area ranged from 48.37 for Head Start to 77.20 for Private Preschool plus Parents as Teachers. Overall mean for the motor area is 59.54.

Table 13. Total Significance as determined by ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19610.966	7	2801.567	3.180	.003
Within Groups	467834.058	531	881.043		
Total	487445.024	538			

The ANOVA for the total score of the DIAL-4 showed no significant variance within each group. There is a significant variance between groups of the independent variable, so the Tukey test was completed to determine where the significant variance was found

Table 14. Head Start Total Significance as determined by Tukey

Group	Significance (0.05)
Public Preschool +PAT	0.048
Private Preschool + PAT	0.011

Table 15. Parents as Teachers Significance as determined by Tukey

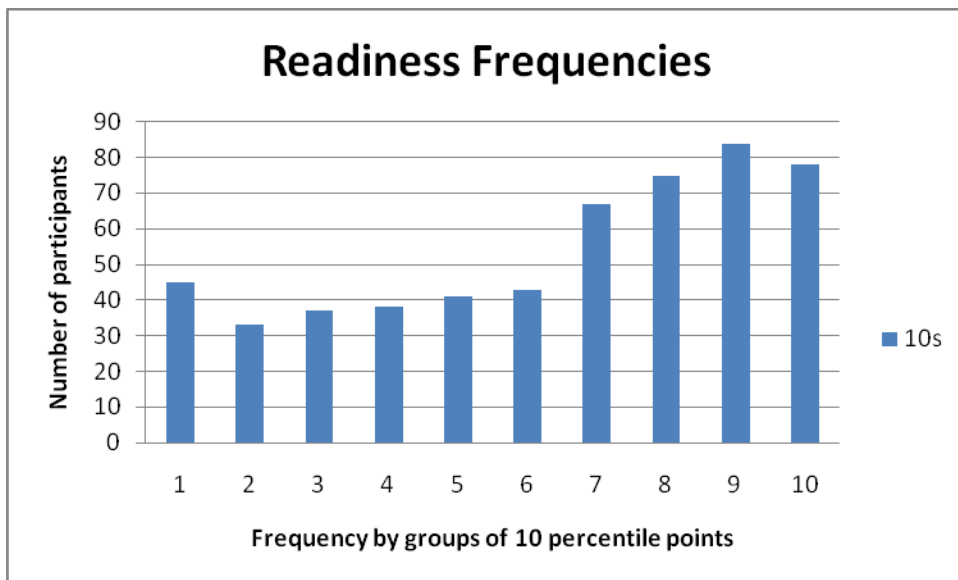
Private Preschool + PAT	0.018
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Statistical significance in the Total area is seen between Head Start only compared to Public Preschool with Parents as Teachers as well as Private Preschool with Parents as Teachers, with the combination of programs being significantly higher than Head Start. Parents as Teachers alone is also found to be significantly lower than Private Preschool with Parents as Teachers.

Between the 278 male and 261 female students included in the study, no significant differences were found in any area of the DIAL-4 or its total. Mean scores of girls were consistently higher, but not notably as shown using the t-test.

Concerning overall readiness, using the 40th percentile or below as generally not ready for kindergarten, 153 students scored in this category. Determination of potential readiness for kindergarten based on percentiles showed 153, or 28.28 percent of the students had a total DIAL-4 score at or below the 40th percentile mark. Of these, 45 also scored below 10 percent, indicating a need for intervention. On the other end of the spectrum 54 students, 10 percent, scored at the 95th percentile or higher indicating extreme readiness.

Table 16. Frequency of total scores grouped by 10 percentile points



Bar 1 is 0-10 percentile points, bar 2 is 11-20th percentile, continuing until bar 10 which is 91 to 100th percentile. Those participants in frequencies one, two, three and four would be considered lacking in Kindergarten Readiness skills as measured by the DIAL-4. The

45 students in frequency one scored at or below the 10th percentile, indication of a need for evaluation for academic intervention.

Seventy-one percent of the students scored in the readiness range of 41 to 99 percentiles. The majority of these fell above the 70th percentile, with the most frequent scores being in the 81-90 percentile range, involving 15.74 percent of participants.

Summary

Children come to Kindergarten with a wide variety of experiences. This study looked at 539 students from eight schools in Southwest Missouri as they took the DIAL-4 screener prior to kindergarten entrance. Students were clustered by early experiences prior to this screening, which included no formal experience, public preschool including early intervention programs, private preschools, Head Start, and Parents as Teachers. Also included were combinations of the three classroom based programs with the home-based Parents as Teachers. Participation in the survey was limited by the time at which the information was sent to district administrators and personnel preparing for summer break.

Examining the three areas of the DIAL-4 plus the total revealed significant differences in student preparation in each domain. Most exceptional was Head Start alone scores being lower compared to the other groups in motor and language. The concepts category was dominated by those students who attended public preschool plus participation in Parents as Teachers. Overall, those children who participated in a formal preschool program, plus the home visiting Parents as Teachers did best on the screening. Conclusions from this data will be drawn in the following chapter.

CHAPTER FIVE

CONCLUSIONS AND RECOMENDATONS

Introduction

"A child is not an object to be molded, but rather a treasure to be unfolded"
(Anonymous) Brain development of the prenatal child is mainly dependent on the experiences and activities of the mother. Following birth, the individual's experience with the environment embraces a critical contributing role in the continuing formation of connections within the brain. Billions of neurons that are produced during the prenatal period are waiting for connections of the axons and dendrites through the synapses. Myelination, the fatty coating of the axons that increases the efficiency of neuron communication, begins prenatally and continues following birth (Twardosz, 2012). As the brain continues to make associations, the experiences of the child sustain, encourage, expand, and reinforce the mental connections. Children's learning begins at birth, not when they enter kindergarten. They need to be actively learning and engaged at an early age. Learning depends on healthy brain development, having caring, responsive adults in their lives. The ability to pay attention, follow directions, and manage their impulses determine how well children can learn (Lipkowitz, R. and Poppe, J., 2014).

One of the common experiences for children is a Kindergarten screening prior to Kindergarten entrance. Working on this common experience, the DIAL-4 scores of 539 children from eight different Southwest Missouri schools were compared using ANOVA, post hoc Tukey, and *t*-test. Areas of the DIAL-4, Motor, Concepts, Language, and Total were weighted against the students' early experiences prior to the screening. Prior

experiences were divided into groups of no formal experiences, public preschool, private preschool, Head Start, Parents as Teachers, and the three formal preschool experiences coupled with Parents as Teachers. Research by Zigler and Pfannenstiel (2007) showed participation in Parents as Teachers alone, or in combination with other preschool services can increase a child's learning aptitude. Zigler's research showed 82 percent of children living in poverty that participated in Parents as Teachers and preschool, with an intensity of two years of PAT and one of preschool, entered Kindergarten more ready to learn than those who had not been involved with either service. This Kindergarten readiness was not restricted to those children in poverty. The higher income children showed a 93 percent readiness for Kindergarten with the same intensity of participation. In addition, the third grade scores on the Missouri Achievement Program communication test were again higher for those children who had participated in Parents as Teachers and/or preschool than those who did not have those experiences. (Pfannenstiel, Zigler, 2006) . Barnet and Barnet (1988) discuss The Carnegie Foundation's survey of more than 7,000 Kindergarten teachers regarding the readiness of children entering their class. These Kindergarten teachers believed their current students were more poorly prepared for school than those they taught five years prior. The area of greatest concern was the language development of the students. The Carnegie Foundation study was based not on documentation, but on teachers' impressions.

Conclusions and Recommendations

There is a statistically significant relationship between early childhood experiences and overall performance on the DIAL-4. Impressions of Kindergarten teachers in the Carnegie study regarding the increasing lack of readiness of children

entering their classes underprepared for learning (Barnet, 1988) would be validated by the data showing 28.28 percent of the 539 students surveyed scored at or below the 40th percentile on the DIAL-4. No significant difference was apparent between genders. There was a significant difference in Language scores between Head Start children and those in the other groups. Head Start children, by the nature of the program, start at a disadvantage due to socio-economic conditions and other at-risk factors. Head Start children were also significantly lower than the rest of the participants on motor skills, including gross and fine motor abilities. Concepts was a different matter, with Head Start students actually scoring significantly higher than students attending a public preschool with Parents as Teachers participation.

There is a statistically significant relationship between early childhood experiences and performance on individual areas of the DIAL 4. Language development is a familiar topic in early childhood literature. The stress placed on the importance of language growth and development would lead to the assumption that the language area of the Kindergarten screening would show the most significant differences of all the areas. The data did not support this, as the motor area had the greatest amount of significant difference as shown by the Tukey post-hoc test.

In general, those students participating in some type of formal preschool setting and participating in Parents as Teachers tended to score better than those without the home visiting program that emphasizes developmental information and parental involvement with their children. The economic and at-risk factors did not appear to overbalance the positive benefits of early, active parental involvement with the education of their children. Participation in Parents as Teachers alone did not have significant

advantage, when in conjunction with a formal preschool program, the results were very positive.

Gender does not play a role in school readiness. Between the 279 male and 260 female students included in the study, no significant differences were found in any area of the DIAL-4 or its total. Mean scores of girls were consistently higher, but not notably as shown using the t-test.

Recommendations

Based on the results in this study, it is recommended that school districts expand their Parents as Teachers programs to include more families. The parent as a child's first and most important teacher is highlighted with Parents as Teachers. With the importance of Head Start and Parents as Teachers on children that are considered to be at risk of experiencing educational difficulty, it would ensue that emphasis would be placed on the expansion and increased fidelity of these family oriented programs. This would require the recruitment and training of additional parent educators and a willingness on the part of the district to invest in the PAT program beyond the state allocation for services. Head Start should be supported with professional development on the incorporation of motor and language skills into their curriculum and the understanding of differentiated instruction within play for children. Partnerships within local districts would be an avenue for this training, as well as it being incorporated into the Head Start professional development plan. Other avenues would be conferences such as a one dedicated to early childhood education. Public Preschool should include the parent involvement and education elements either as an extension of PAT or their own independent program. Kindergarten teachers and administrators should be aware of the number of students not

ready for Kindergarten and the information regarding motor and language areas of development so they could be prepared to address these student needs from the first day the student attends Kindergarten. Communication of the developmental needs may be addressed with the compilation of a database of results as screenings are done. District designated levels for specialized programs or further evaluation should be set and the results of the screenings shared with appropriate personnel.

Recommendations Further Study

As this study progressed, more questions arose. Recommendations for further study would include, but not be limited to:

- Comparison of pre- and post formal preschool scores on a screener such as the DIAL-4.
- The effect of increased parental involvement in all programs, as well as the PAT participation.
- Factors influencing the continuance of parental involvement through elementary school and beyond.
- Type of curriculum is used by the various programs and their effect on Kindergarten screening results.
- The impact of age at the time of Kindergarten entrance on school performance.
- The implementation of universal preschool should delay Kindergarten entrance.
- Comparison of Public Preschool results divided into normal, Title 1, and Early Childhood Special Education components.
- The benefits of offering two years of school before first grade, such as a half day program followed by a full day kindergarten.

These topics arose as the results of the study were correlated and would be the basis for the recommendation of additional research studies.

Summary

"We know that children do not begin learning when they enter kindergarten--it really starts at birth. If we want students to be successful in school, they need to be engaged and actively learning at an early age" says Washington Senator Steve Litzrow (Lipkowitz and Poppe, 2014, p.4). The most rapid period of brain growth is in the first few years of life. The foundation of learning that is built during this time effects how the child approaches learning in those early formative years and afterwards. The type of quality interactions that children have with their parents, caregivers, and environment is one of the most important components in the learning foundation that is developed.

Beginning with Plato in 1000 A.D. scholarly people throughout the centuries have been examining the way children learn. Plato advised against force-feeding information to students without providing them the opportunity to relate learning to their own interest or evaluating their readiness (Willis, 2010). One underlying theme has emerged: children learn through play. For learning to occur in a significant manner in young children, it must be fun. Children will repeat fun activities over and over, hardwiring what they are learning into their rapidly developing brains. Learning is enhanced, however, with direct, active, parental involvement in addition to formal preschool experiences. School districts should invest in the education of students starting from the beginning with home visiting programs, followed by quality preschool experiences for all children. Acknowledging the critical role the parents and the early experiences children have in preparing children for kindergarten, schools should promote

the cooperation and communication between these programs and the school. Keeping the communication lines open between teacher, school and parents as the child enters the formal education system is critical for continued success in learning.

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Appendix A

Administrator Survey

Dear Administrator,

The second Goal of Missouri's Top 10 by 20 Missouri Proud is that every child will enter Kindergarten ready to learn. As a graduate student at Southwest Baptist University I am looking into the possible relationship between early experiences and Kindergarten readiness. If your program uses the DIAL-4 developmental screener I would appreciate your help in gathering this information.

- I have attached an excel sheet for your use in gathering this information. Please pass this to your staff that is responsible for Kindergarten screening.
- First, what type of early experience did each child have?
 - Parents as Teachers, private preschool, Head Start, or public school preschool such as MPP, Title I, Special Education?
- Second, each child's chronological age, gender, and scaled scores on the DIAL-4 in the areas of motor, concepts, and language. All this information should be on the first page of the DIAL-4 protocol.
 - Attached is an excel sheet for gathering the information and returning it to me. It is the type of sheet I use each year in our program for ease of use in data collection, so I hope you will find it beneficial also.
 - Return all information to me either via e-mail or USPS by May 31, 2015.

Thank you for assisting with this research. If you have any questions please feel free to contact me.

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Appendix B

Database form - attached to e-mail

Child	Gender	AGE	DIAL-4				Early Experiences			
#	M/F	yr/m o	Motor	Concept	Lang.	Total	Public PS	Private PS	HS	PAT
<i>ex.</i>	<i>M</i>	<i>5-5</i>	<i>30</i>	<i>31</i>	<i>32</i>	<i>93</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
<i>Ex.</i>	<i>F</i>	<i>4-10</i>	<i>28</i>	<i>19</i>	<i>25</i>	<i>72</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
<i>Ex</i>	<i>M</i>	<i>5-11</i>	<i>30</i>	<i>29</i>	<i>20</i>	<i>69</i>	<i>No</i> <i>Yes</i>	<i>No</i>		<i>No</i>
1										
2										
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">↓</div> <div style="text-align: center;">↓</div> <div style="text-align: center;">Continue as needed</div> <div style="text-align: center;">↓</div> </div>										

Appendix C

Participating Schools

SCHOOL	Number	Percentage of Study (rounded to 0.01)
Carthage (random sample)	26	0.05
Golden City	11	0.02
Jasper	37	0.07
Lamar	74	0.14
Liberal	24	0.04
Sarcoxie	44	0.08
Seneca	80	0.15
Springfield (random sample)	20	0.04
Webb City	224	0.42

Appendix D

Comparison of Missouri's Early Learning Standards to National Head Start, Washington State, Virginia, Arkansas

http://www.dese.mo.gov/earlylearning Missouri MELS	HS	WA	VA	AR
Literacy Symbolic Development Represents feeling and ideas in a variety of ways.	X		n/a	
Speaking/Expressive Uses language to communicate Uses expanded vocabulary	X X	X	n/a	X X
Listening/ Receptive Language Listens for different purposes.	X	X	n/a	X
Reading Applies early reading skills Uses concepts of print Attends to sounds in language (phonological awareness)	X X X		n/a	X X
Writing Uses writing as a means of expression/communication.	X		n/a	X
Social and Emotional Development Knowledge of Self Exhibits self-awareness Develops self-control Develops personal responsibility	X X X	X X	X X X	X X X
Knowledge of Others Builds relationships of mutual trust and respect with others. Works cooperatively with children and adults.	X X	X	X X	
Approaches to Learning Shows curiosity. Takes initiative. Exhibits creativity. Shows confidence. Displays persistence. Uses problem solving skills	X X X X X	X X	X X X X X	X

Mathematics Number and Operations Uses number to show quantity. Uses language to represent number of objects. Solves problems using number. Uses numerical representation.	X X X X		n/a	X X
Geometry and Spatial Sense Investigate positions and locations. Explores shapes in the environment.	X		n/a	
Patterns and Relationships (Algebra) Recognizes relationships in the environment .Uses patterns in the environment	X X		n/a	X X
Measurement Makes comparisons. Uses measurement.	X X		n/a	
Exploring Data (Probability) Collects, organizes and displays information. (Charting and Graphing)			n/a	
Science Physical Science Explores physical properties of objects and materials. Investigates properties of objects and materials. Solves problems involving physical properties of objects and materials. Represents observations of physical world in a variety of ways.	X X		n/a	
Life Science Explores, investigates, solves problems, and represents observations about living things in a variety of ways.	X		n/a	
Earth and Space Explores properties of Earth and Space. Investigates properties of Earth and Space. Solves problems involving Earth and Space. Represents observations about Earth and Space in a variety of ways.	X		n/a	
Physical Development, Health and Safety Physical Development Uses gross motor skills with purpose and coordination. Uses fine motor skills with purpose and control. Responds to sensory input to function in the environment.	X X	X	n/a	X X

Health --Practices healthy behaviors	X	X	n/a	
Safety --Practices safe behaviors.	X	X	n/a	

Compiled from:

Allen, 2008

Arkansas Department of Human Services, 2003

Barnet, 2005

Missouri DESE, 2013

Washington State Department of Early Learning, 2013

Appendix E

Missouri

Missouri Early Learning Standards for three to five year olds in chart form.

Literacy			
Symbolic Development	Represents feeling and ideas in a variety of ways		
Speaking/ Expressive	Uses language to communicate	Uses expanded vocabulary	
Listening/Receptive Language	Listens for different purposes		
Reading	Applies early reading skills	Uses concepts of print	Attends to sounds in language, i.e. phonological awareness
Writing	Uses writing as a means of expression/ communication		
Physical Development, Health and Safety			
Physical Development	Uses gross motor skills with purpose and coordination	Uses fine motor skills with purpose and control	Responds to sensory input to function in the environment
Health	Practices healthy behaviors		
Safety	Practices safe behaviors		
Social and Emotional Development and Approaches to Learning			
Knowledge of Self	Exhibits self-awareness	Develops self-control	Develops personal responsibility
Knowledge of Others	Builds relationships of mutual trust and respect with others	Works cooperatively with children and adults	
Approaches to Learning	Shows curiosity	Takes initiative	Exhibits creativity
	Shows confidence	Displays persistence	Uses problem solving skills
Mathematics			
Number and Operations	Uses number to show quantity	Uses language to represent number of objects	Solves problems using number
	Uses numerical representation		

Missouri MELs cont.

Geometry and Spatial Sense	Investigate positions and locations	Explores shapes in the environment	
Patterns and Relationships (Algebra)	Recognizes relationships in the environment	Uses patterns in the environment	
Measurement	Makes comparisons	Uses measurement	
Exploring Data (Probability)	Collects, organizes and displays information (Charting and Graphing)		
Science			
Physical Science	Explores physical properties of objects and materials	Investigates properties of objects and materials	Solves problems involving physical properties of objects and materials
	Represents observations of physical world in a variety of ways		
Life Science	Explores, investigates, solves problems, and represents observations about living things in a variety of ways		
Earth and Space	Explores properties of Earth and Space	Investigates properties of Earth and Space	Solves problems involving Earth and Space
	Represents observations about Earth and Space in a variety of ways		

Compiled information from:

Missouri Department of Elementary and Secondary Education

<http://www.dese.mo.gov/earlylearning>

Appendix F

Readiness Indicator Percentiles

TOTAL Percentile	Number of Students (from Total of 542)	Percentage of Participants
↓ 40th	153	29.15
↓ 10th*	45	8.3
↑ 95th	54	9.59
MOTOR AREA Percentile	Number of Students	Percentage of Participants
↓ 40th	149	27.49
↓ 10th*	55	10.15
↑ 95th	65	11.99
CONCEPT AREA Percentile	Number of Students	Percentage of Participants
↓ 40th	194	35.79
↓ 10th*	71	13.09
↑ 95th	27	4.98
LANGUAGE AREA Percentile	Number of Students	Percentage of Participants
↓ 40th	212	39.11
↓ 10th*	70	12.92
↑ 95th	21	3.87

*included in the below 40th percentile group

95th Percentile and Above, Early Experiences Reported

Early Experiences	MOTOR N=65	CONCEPTS N=27	LANGUAGE N=21
None	15	7	3
Public Preschool	12	7	1
Private Preschool	3	2	1
Early Experiences	MOTOR N=65	CONCEPTS N=27	LANGUAGE N=21
Head Start	2	1	0
Parents as Teachers	7	2	3
Pub. Preschool + PAT	23	5	10
Private Preschool + PAT	2	3	3
Head Start + PAT	1	0	0