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An Examination of Movement between Preschool and Kindergarten Classrooms for Young Children with Developmental Disabilities

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AN EXAMINATION OF MOVEMENT BETWEEN PRESCHOOL AND KINDERGARTEN CLASSROOMS FOR YOUNG CHILDREN WITH DEVELOPMENTAL DISABILITIES

by

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ABSTRACT

The researcher in this investigation describes the similarities and differences of movement in preschool and kindergarten classrooms for young children with developmental delay. Through the use of a mixed method research design, the researcher examined how movement is integrated throughout a school day and integrated into teacher-directed mathematics activities. This study used a multiple case study method that included observations of preschool (*n*= 3*)* and kindergarten (*n*= 3) classrooms to determine similarities and differences in movement. In addition, a quantitative measure was embedded within the multiple case study design to compare movement of children with developmental delay. A thematic analysis resulted in themes connected to movement and teachers' perceptions in preschool and kindergarten. Preschool case themes included the use of videos with music for movement, literacy movement, physical transitions, fine motor activities, free play and fine motor manipulatives. Kindergarten case themes included: physical transitions, special areas, fine motor activities, and fine motor workbook activities. The researcher determined that while young children with disabilities in kindergarten classrooms exhibited higher levels of physical activity, as measured by steps taken, than young children with disabilities in preschool classrooms, preschool teachers consistently integrated a variety of movement activities at a higher rate. The results of this study exposed the need for a shared community interest of developing a scaffolding structure between preschool and kindergarten to ensure an effective transition between settings for children with DD.

This dissertation is dedicated to my family, my husband, Brian, my sister, Hailey, my mother, Lesa, and father, Harvey. Thank you for believing in me even during the times that I did not believe in myself. To my husband, I am extremely grateful for your unending support and love through this process.

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LIST OF ACRONYMS

BEH: Bureau of the Education of the Handicapped

DAP: Developmentally Appropriate Practices

DD: Developmental Delay

DEC: Division for Early Childhood

EAHCA: Education for All Handicapped Children Act

EASY Minds: Encouraging Activity to Stimulate Young Minds

ECSE: Early Childhood Special Education

EOA: Economic Opportunity Act

FAPE: Free Appropriate Public Education

HCEEP: Handicapped Children's Early Education Program

IDEA: Individuals with Disabilities Act

IEP: Individualized Education Program

IFSP: Individualized Family Service Plan

IMBAs: Integrated Movement Based Activities

IRB: Institutional Review Board

LEAs: Local Educational Agencies

LRE: Least Restrictive Environment

NAEYC: National Association for the Education of Young Children

NANE: National Association for Nursery Education

SEAs: State and Education Agencies

UDL: Universal Design for Learning

CHAPTER 1: INTRODUCTION

Statement of the Problem

Many young children transitioning from early childhood settings to kindergarten classrooms find themselves in a critical stage in their educational programing (Fowler, Schwartz, & Atwater, 1991; Fowler, 1982; Welchons & McIntyre, 2015). During this transition, sometimes acute and unique challenges arise for students with developmental disabilities (DD) — specifically, those receiving early intervention services. In this chapter, the researcher describes some of these potential challenges, including the process for identification of DD, the transition process from preschool to kindergarten, the importance of movement within and across these settings, the relationship of movement in mathematics in these settings, and key terms used in this study.

A unique characteristic in early intervention settings and special education is the use of the term DD. This term is used not to place a specific diagnosis on a young child, but to give a signal to teachers that support is needed; however, clarity on the frequency and level of support for students with DD is still emerging. Without specifically looking at individualized goals, the label of DD is fairly generic. The criteria for identification includes: (a) children between the ages of three and nine, (b) showing a delay in one of the developmental domains, and (c) requiring special education services due to the delay (Individuals with Disabilities Act, 2004). The DD label is typically given to students between the ages of three through nine, and when they reach the age of three, the service delivery model for early intervention services transitions from an Individualized Family Service Plan (IFSP) to an Individualized Education Program (IEP). Every year, approximately 750,000 children with disabilities, three to five-years-old, are

served under Part B of IDEA in preschool and kindergarten classrooms; yet, the majority are provided with this generic term of DD. Assigning the label of DD allows children time to continue growing from early intervention and to reach development milestones, perhaps before they are challenged throughout their educational career with a permanent special education label. Of the more than 750,000 children, roughly 37% are categorized as having DD, which is 277,500 of children ages three to five, receiving services annually in the U.S. (U.S. Department of Education, 2016), and the majority are served under the label of DD.

Therefore, gaining a greater sense of what "transitioning" is for students who are often identified DD, and how it works within the confines of the educational space related specifically to movement in early childhood development, provides a platform for this research analysis. The Division for Early Childhood (DEC) defines "transitioning" as, "the events, activities, and process associated with key changes between environments or programs during the early childhood years and the practices that support the adjustment of the child and family to the new setting" (Division for Early Childhood, 2014, p. 16).

With framing of transitioning in mind, researchers have started to address the challenges that hinder the educational process for students with DD and their educators. The skill sets all students need to transition from one environment to the next, including those identified with DD, are long and varied, which many young children do not master (Fowler et al., 1991; McIntyre, Blacher, & Baker, 2006; Zucker 2010). Although the majority of the transition process relies on the cognitive aspects of student's development, educators have expressed a need for skills beyond academics to include readiness skills of (a) following directions, (b) developing motor skills, (c) paying attention, and (d) transitioning to an array of classroom activities appropriately

(Cameron, et al., 2012; Diamond, 2010; Grissmer, Grimm, Aiyer, Murrah, & Steele, 2010; Johnson, Gallagher, Cook, & Wong, 1995; Odluyurt & Batu, 2009, Rimm-Kaufman, Pianta, & Cox, 2000).

The mastery of physical movement has been linked to positive outcomes for functional and cognitive development for young children with and without disabilities (Bijorklund, Brown, 1998; Cameron, Cottone, Murrah, & Grissmer, 2016; Colwell & Lindsey, 2003; Davis, Pitchford, & Limback, 2011; Piek, Dawson, Smith, & Gasson, 2008); yet, how this change in settings shifts the need or application of movement is not clearly defined. Understanding the depth and breadth of movement in early childhood and kindergarten settings is important since the functional skills that play a key factor in successful transitions have been linked to the development of motor skills (Kenny, Hill, & Hamilton, 2016). Yet, Troup and Malone (2002), have identified that when children transition to kindergarten, a stronger focus is placed on academic skills and more table work, implying less time for movement in the classroom.

With the fundamental importance of academic skills and functional skills—both being linked to development through physical movement, the potential for a decrease in movement opportunities as students transition to kindergarten is a possibility. Despite the focus on the combined synergy provided for students with movement and learning, identifying and describing how movement is different in preschool and kindergarten settings for young children with DD is an untapped area of research.

Theoretical Framework

The development of early childhood practices for children with and without disabilities is based on the work of many seminal theorists (Brown, Collins, & Duguid, 1989; Dewey, 1959; Piaget & Inhelder, 1969). Using a developmental framework, the theoretical lenses to investigate movement and mathematical practices in kindergarten and preschool settings, selected to frame this research, are situated learning (Brown et al., 1989), cognitive development (Piaget & Inhelder, 1969), and child-centered theory (Dewey, 1959).

Situated learning is the theory that children learn best when they have opportunities to actively participate within the lesson (Brown et al., 1989). This theory provides the lens for the researcher to determine the extent young children with disabilities actively participate, through movement, in a variety of activities and settings. Active participation in early childhood classrooms can include lessons that facilitate movement and engagement, and not only lessons following a scripted "lecture." This situated learning theory provides the framework for looking at practices within and across settings, with a specific lens aimed at the movement activities occurring in practice and in mathematics.

Piaget's cognitive development theory is about how children develop in stages (Piaget & Inhelder, 1969). These stages include: (1) sensorimotor, (2) preoperational, (3) concrete operational, and (4) formal operational. Although the sensorimotor stage refers to children between the ages of 18-24 months, it provides a framework for the importance of movement for children. In the sensorimotor stage, children are exploring their environment through physical interactions. As children move to the preoperational stage, they begin to use their exploration to

develop memories and make connections between things (Piaget & Inhelder, 1969). This theory frames the observation of movement in the classroom.

With situated learning providing the lens to look at engagement, John Dewey's (1959) theory of creating a child-centered environment aligns closely with this study. Dewey notes children learn through active engagement in a child-centered environment by promoting cognitive development. The child-centered approach includes allowing children to be responsible for part of their learning through exploration to help create concrete connections to information (Dewey, 1959). Child-centered learning is aligned with the observations of movement, grounded in this study, during instruction in mathematical or number sense activities.

These three frameworks were used to situate both observations and emerging descriptions of the practices observed. These frameworks were used to examine the units of analysis in both preschool and kindergarten settings and within the context of mathematics instruction.

Unit of Analysis

Three units of analysis for this study include: (1) teacher's perceptions of the importance of different teaching strategies, including the use of integrating movement; (2) movement in preschool and kindergarten classrooms for young children with disabilities; and (3) the integration of movement in teacher-directed mathematics activities. Teachers' perceptions are defined as their thoughts and understandings of concepts that have been impacted from past experiences (Atkinson, Atkinson, Smith, & Hilgard, 1987; Beijaard, Verloop, & Vermunt, 2000). The unit of teachers' perceptions were explored to identify if their perceptions of different, instructional strategies impacted their teaching because "the degree to which instructional

strategies are used effectively in class depends largely on teachers' perceptions of them" (Kwon, 2015, p. 18). The unit of analysis, movement in classrooms, is defined by: (a) physical activity that expels energy (Bouchard et al., 1994), (b) discrete physical activities, (c) integrated movement-based activities (IMBAs), and (d) brain breaks (Nalder & Northcote, 2015). The researcher identified and provided a thick, rich and detailed description of what movement looks like in preschool and kindergarten settings. In addition, movement was compared across settings. The final unit of analysis was the integration of movement in teacher-directed mathematics activities and was described within settings and across settings. The integration of movement in teacher-directed activities included explicit mathematics lessons as well as naturally occurring experiences in which the teacher provided instruction (National Council of Teachers of Mathematics, 2000), and physical movement, other than physical education curriculum, as part of the instructional strategy to teach students mathematics (Nadler & Northcote, 2015).

Purpose of the Study

The researcher's purpose in conducting this study was to examine and describe the differences in preschool and kindergarten classroom settings, as it pertains to movement and movement-based mathematics activities, for young children with disabilities. Teachers' perceptions of teaching strategies provided insight into if, and why, teachers use movement in their classrooms. Comparisons between the two observed settings, preschool and kindergarten, were recorded and interpreted through qualitative data and descriptions to provide further information about how movement may be impacting young children with DD. In addition, a quantitative measurement of physical activity for students with DD was recorded with an

ActiGraph accelerometer. The embedded quantitative measure is to provide further depiction of the comparison of movement in preschool and kindergarten. The purpose of observing movement in preschool and kindergarten settings was to identify potential implications for how different stakeholders can create environments to promote the development of skills that support successful transitions between educational settings. In addition, the purpose of this research study was to dive further into how movement is integrated into instructional domains, and any unique instance of use in mathematics.

Research Questions

The following research questions were addressed in this study:

1. How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of
    a. Different teaching strategies for students with DD?
    b. Integrating movement into activities as a teaching strategy for students with DD?
2. How are practices integrated into preschool classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?
3. How are practices integrated into kindergarten classrooms for young children with disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

4. What are the differences in preschool and kindergarten classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher directed mathematics activities?

Significance of the Study

The data collected from this study provides detailed information about the differences and similarities between preschool and kindergarten classrooms that include young children with disabilities in the areas of movement and movement integrated into mathematics activities. The findings from the study provide additional information about the integration of movement during teacher-directed mathematics activities and the comparison between preschool and kindergarten. The information contributes to the body of literature about movement for young children. Growing the literature base about movement through identifying the differences in preschool and kindergarten for young children with DD has the potential to impact teaching strategies for both populations of teachers. By examining the movement integration into mathematics for young children with DD, information was gleaned to determine if the teaching practices have similarities or differences in preschool and kindergarten, which could provide insight into how teachers provide instruction in inclusive educational environments in mathematics to potentially promote more successful transitions. The researcher's intention was to provide a foundation of research for using movement-based interventions to impact young children's social, emotional, behavioral, functional, and cognitive development.

Organization of the Study

A mixed method research design was employed to explore similarities and differences between preschool and kindergarten settings, as it pertains to movement and movement-based activities in mathematics (Creswell & Plano Clark, 2007). The mixed method design included a multiple case study approach with a quantitative measure embedded. A multiple case study design was used to provide a rich, detailed description of the classrooms, movement, and the integration of movement during mathematics for young children with disabilities (Yin, 2009). The embedded quantitative measure included the use of ActiGraph accelerometers to measure the extent that movement is different for students with DD in preschool and kindergarten. The ActiGraph accelerometer is a nonintrusive device that goes around a student's waist to measure the number of steps (see Figure 1). The procedures of the mixed method design were broken down into four phases. Phase one included the finalization of the study design and details. Phase two included completion of all necessary processes and paperwork for study approval. Phase three was the process of collecting all data from multiple sources. The multiple sources of data included classroom schedules, lesson plans, interviews, observations, and a teacher survey used to create the detailed narrative description, along with the collection of ActiGraph accelerometer data. The final phase, phase four, included analyzing the study data in an organized manner. The reporting of data connected to research questions was also included in phase four.

Figure 1. ActiGraph accelerometer.

Operational Definitions

Listed below are operational definitions detailing main terms and concepts used in this study. All definitions are gathered from legal sources, literature, or product websites.

Autism: Defined by the fifth edition of the Diagnostic Statistical Manual of Mental Disorders (DSM-V; American Psychiatric Association, 2013), Autism is characterized as "persistent deficits in social communication and social interaction across multiple contexts" (p. 50).

Actigraphs: Accelerometers that produce quantitative data to measure objective activity, including steps taken (ActiGraph, LLC., 2017). "Accelerometers provide dimensionless physical activity scores in 'counts' which are summarized over a user specified time period or epoch" (Pulsford et al., 2011, para. 9).

Brain Breaks: Movement-based activities that provide children the opportunity to stand up and move around during a lesson, but the movement is not always integrated into lesson components (Nadler & Northcote, 2015).

Discrete Physical Activity: Includes teacher or instructor-directed physical exercises that are not necessarily connected to academic content (Nadler & Northcote, 2015).

Developmental Delay: Developmental Delay is defined by the IDEA amendments (2004) as (B) "CHILD AGED 3 THROUGH 9.— The term child with a disability for a child aged 3 through 9 (or any subset of that age range, including ages 3 through 5), may, at the discretion of the State and the local educational agency, include a child—(i) experiencing developmental delays, as defined by the State and as measured by appropriate diagnostic instruments and procedures, in 1 or more of the following areas: physical development; cognitive development; communication development; social or emotional development; or adaptive development; and (ii) who, by reason thereof, needs special education and related services" (118 STAT. 2652).

Developmentally Appropriate Practices: "Framework for best practice. Grounded both in the research on children development and learning, and in the knowledge base regarding educational effectiveness, the framework outlines practice that promotes young children's optimal learning and development" (Copple & Bredekamp, 2009, p. 1).

Division for Early Childhood (DEC) Recommended Practices: A document developed by the Division for Early Childhood "to provide guidance to practitioners and families about the most effective ways to improve the learning outcomes and promote the development of young children, birth through five years of age who have or are at risk for developmental

delays or disabilities… The DEC recommended practices are based on the best-available empirical evidence as well as the wisdom and experience of the field" (Division for Early Childhood, 2014, p. 3).

Head Start: Head Start is a "comprehensive early education program for young children in low-income families to meet their emotional, social, health, nutritional, and psychological needs" (McLean, Sandall, & Smith, 2016, p. 5).

IEP: An IEP is an Individualized Education Program for children who have been identified to have a disability. The IEP consist of different components, including (a) annual goals, (b) special education and related services, (c) participation with nondisabled children, (d) participation in state and district-wide tests, (e) dates and places, (f) transition service needs, (g) age of majority, and (h) measuring progress (Kupper, 2000, pp. 5-6).

IFSP: "The Individualized Family Service Plan (IFSP) documents and guides the early intervention process for children with disabilities and their families… It contains information about the services necessary to facilitate a child's development and enhance the family's capacity to facilitate the child's development" (Bruder, 2000, pp. 1-2).

Mathematics: Mathematics Education for children ages three to eight include developing numeracy, which is understanding numbers and concepts, and developing mathematical literacy (Dooley et al, 2014).

Integrated Movement Based Activities: "Activities involving physical movement that are used to teach subjects other than physical education in the primary school curriculum" (Nadler & Northcote, 2015, p. 1).

Movement: Movement is described as physical activity (Bouchard, Shepard, & Stephens, 1994) and "1) discrete physical activities; 2) integrated movement-based activities (IMBAs); 3) activities that are commonly referred to as brain break activities" (Nalder & Northcote, 2015, p. 2).

Other Disabilities: Includes deaf-blindness, emotional disturbance, hearing impairments, intellectual disabilities, multiple disabilities, orthopedic impairments, other health impairments, specific learning disabilities, traumatic brain injury, and visual impairments (U.S. Department of Education, 2016, p. 27).

Physical Activity: Movements that expel energy, which includes skeletal muscles that produce body movements (Bouchard et al., 1994).

*Speech-Language Impairment: "*Means a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, or a voice impairment, that adversely affects a child's educational performance" [34 CFR §300.8(c)(11].

Teacher-Directed Mathematics Activities: Include explicit mathematics lessons as well as naturally occurring experiences in which the teacher includes mathematics instruction (National Council of Teachers of Mathematics, 2000)

*Title One Schools: "*Schools that enroll at least 40 percent of children from low-income families" and receive federal, state, and local funds "to upgrade their entire educational programs to improve achievement for all students, particularly the lowest-achieving students" are known as Title One (U.S. Department of Education. Office of Elementary and Secondary Education, Office of State Support, 2015, p. 1).

Young children with disabilities: Children who are between the ages of three to five, who have a documented disability, or are at risk for a disability and receiving special education services through an IEP.

CHAPTER 2: LITERATURE REVIEW

In this chapter, the researcher presents literature about the intersection of movement and development of young children, with and without disabilities, by providing an outline of the growth and history of early childhood special education. Next, current practices in preschool and kindergarten are summarized, as well as a snapshot of the demographics of early childhood special education (ECSE). The researcher then provides a discussion of current practices in early childhood education by reviewing the work from the National Association for the Education of Young Children (NAEYC) and the Council for Exceptional Children - Division of Early Childhood (DEC). In this work practices are highlighted, including facilitating a successful transition for children from preschool to kindergarten settings, with a specific discussion of challenges encountered during the transition process for young children with disabilities. Included in the chapter are connections researchers have made (a) between movement and the developmental skills of young children, (b) between movement and the development of social emotional and self-regulatory skills, and (c) between the integration of movement to improve the development of mathematics competency (Cameron et al., 2016; Colwell & Lindsey, 2003; Davis et al., 2011; Kibbe et al., 2011; Riley, Lubans, Holmes, & Morgan, 2014; Piek et al., 2008).

History Perspective of Early Childhood Special Education

The federally mandated services of early intervention began in the 1970s, but much earlier, in 1799, several events occurred to lay a foundation for the importance and impact of early intervention. A seminal case, documented by Itard in 1799, showed his work with a young

man named Victor, also known as the wild boy of Averyon. After finding Victor in the woods, Victor showed significant signs of cognitive and emotional delay, and Itard implemented strategies in an attempt to improve Victor's cognitive functioning (Itard, 1962). Following the works of Itard, a movement began during the 1800s and early 1900s to focus on the importance and potential impact of education for young children. Friedrich Froebel influenced the development of early childhood education by opening the "German Kindergarten" in 1837 with an educational curriculum consisting of educational "gifts." The gifts were a set of manipulatives based in Froebel's experiences with children, using his architecture and drawing background. These "gifts" were a way to place an emphasis on how developmental skills could be nurtured and directed with a structured environment using guided play (Froebel 1885; Manning, 2005). Additional advances were made in kindergarten education when the first kindergarten classroom opened in 1856 (Jenkins, 1930).

The sisters, Rachel and Margaret McMillan, further affected the kindergarten movement in 1911 with their creation of an Open Air Nursery School, the foundation of development of children who were considered underprivileged. The Open Air Nursery School consisted of instruction for infants from "slum areas" to impact their development through nurture and care (McMillan, 1921; Nutbrown & Clough, 2014).

The kindergarten movement brought about a need for the National Association for Nursery Education (NANE) to provide a network for the exchange of ideas to educate the growing number of children in nursery schools (Davis, 1964). The NANE later changed their name to the National Association for the Education of Young Children (NAEYC). Following McMillian's (1921) work, Maria Montessori, in the 1960s, further impacted the development of

the education of young children with disabilities by examining early education through a scientific lens. Through her scientific studies and research building upon the work of Jean-Marc-Gaspard Itard (1775-1838) and Edouard Seguin (1812-1880), she designed materials and concepts to draw children into learning by requiring the use of their senses. Maria Montessori continued to influence the education of young children, with and without disabilities, by opening a school and publishing her works focusing on children as explorers (Montessori, 1967; Thayer-Bacon, 2012). Her work followed with the opening of the first public kindergarten in 1973 (Shepley, 2008).

As researchers realized the need for improvement in early education, an emphasis was placed on providing support to students of poverty and for education to occur in a developmentally appropriate manner. This shift to education for all and for those who were less fortunate occurred as the U.S. entered what is often referred to as the Civil Rights Movement. This movement was not heavily focused on the education of children with disabilities, but the idea of the right to an education for all was greatly influenced by the Brown v. Board of Education (1953) legislation. The Civil Rights Movement continued to progress under the direction of President John F. Kennedy, who also was an advocate for the rights of people with a disability. As a sibling of a person with a disability, President Kennedy created the "President's Panel on Mental Retardation" in 1961. This panel consisted of experts expected to create a national plan to combat "mental retardation," so they began producing amendments focused on child and maternal health programs (Berkowitz, 1980). After the assassination of Kennedy, Lyndon Johnson continued to champion support for children of poverty by placing a large focus of his presidency on the "War on Poverty." President Johnson's "war" was marked by the

passing of the 1954 Economic Opportunity Act (EOA; Lavor, 1972). The focus of the EOA was to eliminate poverty through ten federal programs. One of the ten programs consisted of funding an initiative called Head Start, which provided early intervention services to children and families from low-income areas. The Head Start services were expanded and began to consider children with disabilities with an amendment to the EOA in 1972, where the government mandated all Head Start centers reserve at least 10% of their space for children with disabilities (EOA, 1964; Lavor, 1972).

As education at a younger age was expanding, so were educational opportunities for all. In 1965, President Johnson signed into law the Elementary and Secondary Education Act (ESEA) as another way to combat the 'War on Poverty' (Reichow, Boyd, Barton, & Odom, 2016). The ESEA consisted of seven different titles, including (a) funding for students in low-income schools, (b) funding for school libraries and textbooks, (c) funding for supplementary education centers, (d) funding for research, (e) grants for state departments, (f) provisions for children with disabilities, and (g) funding for bilingual education. The ESEA provided funding for state operated programs, not only for children of school age, but also for young children with and without disabilities starting at birth (ESEA, 1965). Although the federal government provided funding for early childhood programs, programming at this level was optional for states to adopt. By 1966, approximately five states were providing state operated, four-year-old preschools (Mitchell, 2001).

Early education expanded further in 1968 when Congress enacted P.L. 90-538, the Handicapped Children's Early Education Program (HCEEP), which marked a historic event in the history of early intervention. The HCEEP was the first federal program to put all the attention

solely on young children with disabilities. Through P.L. 90-538, the Bureau of the Education of the Handicapped (BEH) awarded funds to states to create early education programs for children with disabilities. These programs included experimental preschools focused on effective ways to educate young children with disabilities through early intervention. Two years after the start of HCEEP, the BEH funded 24 demonstration projects, and approximately seven years after the enactment, every state had at least one project with roughly 20,000 children being served by 1975 (DeWeerd & Cole, 1976). The results of HCEEP lead to "(a) widespread awareness of the effects of early intervention; (b) advocacy groups that included family members, research, and service providers; and (c) ECSE teacher certification programs established at universities across the nation" (Reichow et al., 2016, pp. 5-6). By 1986, the government decided to reauthorize HCEEP by passing P.L. 99-457 and renamed the law the Early Education Program for Children with Disabilities (EEPCD).

With the continued initiatives of the EEPCD along with Head Starts' inclusion of young children with disabilities, a need grew for educated teachers to work with infants and children in early intervention. The Council for Exceptional Education sought to further support this certification of teachers by creating a branch in 1973 known as the Division for Early Childhood (DEC). The DEC "promotes policies and advances evidence based practices that support families and enhance the optimal development of young children (0-8) who have, or are at risk for, developmental delays and disabilities" (Division for Early Childhood, 2014, p. 1).

A national platform for children with disabilities, including early intervention services for ages three to five, was a permanent part of the educational system through legislation passed in 1975. The U.S. Congress signed into law the Education for All Handicapped Children Act

(EAHCA), Public Law 94-142, a landmark law that mandated states to provide educational assistance to children with disabilities ages 3-21. The Education for All Handicapped Children Act was later renamed the Individuals with Disabilities Act (IDEA). The law consisted of six main points aligned with support for children with disabilities: (1) an Individualized Education Program (IEP), (2) a free and appropriate public education (FAPE), (3) the least restrictive environment (LRE), (4) appropriate evaluation, (5) parent and teacher participation, and (6) procedural safeguards. For children three to five-years-old, states were only required to provide FAPE if they were already providing education services to children without disabilities, three to five years of age.

Although the IDEA was a monumental law for children with disabilities, it was not until 1986 that Congress passed Public Law 99-457 to add Part H (now know as Part C) that mandated states to provide FAPE to individuals, three to five, with disabilities. Part C at the time also included a voluntary program for states to provide early intervention services to children, birth to two-years-old. The amendment of Part C mandated that early intervention

> (1) enhance the development of handicapped infants and toddlers and to minimize their potential for developmental delay, (2) reduce the educational costs to our society… (3) minimize the likelihood of institutionalization of handicapped individuals and maximize the potential for their independent living in society, and (4) to enhance the capacity of families to meet the special needs of their infants and toddlers with handicaps. (Education of the Handicapped Act Amendments, 1986, 1 USC § 101)

Services under Part C currently include (a) IFSP; (b) occupational therapy; (c) psychological services; (d) family training and counseling; (e) speech pathology and audiology; (f) physical therapy; (g) early identification, screening, and assessment; and (h) specialized instruction.

With a federal law requiring state leaders in education to provide a FAPE for young children, the DEC Executive Board decided to appoint a task force, in 1991, to collect, evaluate, and disseminate a set of indicators to the field of practitioners and families working with children in early intervention (DEC Task Force on Recommended Practices, 1993). The Task force refined the indicators through the knowledge of experts in the field and published the first set of recommended practices, which included 415 practices (Odom & McLean, 1996). In 2005, a revised set of recommended practices were published to include 240 practices (Sandall, Hemmeter, Smith, & McLean, 2005). The DEC recommended practices that correlated with the NAEYC's Developmentally Appropriate Practices (DAP), which included overlaps in the areas of: (a) range in services provided, (b) individualized teaching plans, (c) appropriate assessments, (d) effective instructional methodologies/procedures, (e) instructional procedures of active involvement and participation, (f) strengthening families abilities to help with their child's development, and (g) outcome-based practices (Carta, Schwartz, Atwater, & McConnell, 1991). Most recently, the DEC published 66 recommended practices in 2014 "to provide guidance to practitioners and families about the most effective ways to improve the learning outcomes and promote the development of young children, birth through five years of age, who have or are at risk for developmental delays or disabilities" (Division for Early Childhood, 2014, p. 1).

Preschool

Quality preschools have been shown to significantly impact academic and social development by (a) creating a nurturing environment for children; (b) respecting children's culture; (c) engaging children in deep, rich language activities; (d) individualizing materials while challenging cognitive development; and (e) including families in the process (Espinosa, 2002). In addition, quality preschools offer children the opportunity to play, explore, and move to affect their social, emotional, and cognitive development (Espinosa, 2002). The evolution of early childhood practices for students with disabilities that exists today parallel the overall movement of the development of preschool services. The ESEA of 1965 provided states with funding to provide early childhood programs, such as preschool. Primarily, five states opted to receive funding for preschool services (Mitchel, 2001); yet, by 2017, there were still six states whom did not provide state funding for preschool services (Diffey, Parker, & Atchison, 2017). For young children with disabilities, many different avenues existed for receiving preschool services: for example, Head Start and early intervention services. In 1972, Head Start was mandated to provide services to young children with disabilities (Lavor, 1972). Then, through the EHA Amendments of 1986, all states were required to provide early intervention services to young children with disabilities, ages three to five. These services were, and still are, provided in a variety of environments, such as regular education programs, separate classes, and home-based services (U.S. Department of Education, 2017).

Kindergarten

A similar evolution to preschool is the current focus on providing full-day or half-day kindergarten to all students, including students with disabilities. In a 2014 report conducted by the Education Commission of the States (ECS), a total of 11 states, including the District of Columbia, offered full day kindergarten, 34 states offered half-day kindergarten, and five states did not require the offering of kindergarten education. For states that currently do offer kindergarten, specific standards have been created to guide this early level of education. For example, standards for kindergarten include instruction in English language arts, mathematics, science, and social studies. Additional kindergarten standards for some states include (a) arts education, (b) foreign language, (c) health education, (d) physical education, (e) technology education, and (f) social/ emotional development (Education Commission of the States, 2014). The success of kindergarten programs is well documented (Cryan, Sheehan, Wiechel, & Bandy-Hedden, 1992; Elicker, & Mathur, 1997; Thompson, & Sonnenschein, 2016), but nuances of effectiveness and evidence-based research practices in this youngest field of education are still evolving (Reichow et al., 2016). For some students in kindergarten settings they attend a Title One school. A Title One school serves a higher percentage of children who come from low-income settings than other schools. Schools that are determined to qualify for Title One are provided with additional federal funding to assist with the schools varying needs. In a report published by the U.S Department of Education in 2015, approximately 12 million children in kindergarten through fifth grade are being served in a Title One elementary setting.

Snapshot of Young Children with Disabilities in Preschool and Kindergarten

Looking at the overall services provided to children with disabilities in preschool and kindergarten, approximately 753,687 children, ages three to five, were served under Part B of IDEA in 2014. Of those 753,687 children, 43.7% were categorized as speech language impairments, 37% as developmental delay, 10.5% as other disabilities combined, and 8% as Autism (U.S. Department of Education, 2016). An emerging trend of children being educated across disabilities in early intervention settings is to not diagnose children but to give them a label of DD. This term under the IDEA amendments was created to prohibit students from receiving an inappropriate label (Hadadian & Koch, 2013). The IDEA amendment of 2004 defines DD as

> (B) CHILD AGED 3 THROUGH 9—The term child with a disability for a child aged 3 through 9 (or any subset of that age range, including ages 3 through 5), may, at the discretion of the State and the local educational agency, include a child—(i) experiencing developmental delays, as defined by the State and as measured by appropriate diagnostic instruments and procedures, in 1 or more of the following areas: physical development; cognitive development; communication development; social or emotional development; or adaptive development; and (ii) who, by reason thereof, needs special education and related services. (118 STAT. 2652)

Another category most often diagnosed and seen in early childhood settings for students being served with a disability are those identified as having a speech or language impairment. The label of speech or language impairment is defined in IDEA as " a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that

adversely affects a child's educational performance" [34 CFR §300.8(c)(11]. The third most prevalent category served, and is on the rise for young children with disabilities in preschool and kindergarten, is Autism. Autism is characterized by "persistent deficits in social communication and social interaction across multiple contexts" (American Psychiatric Association, 2013, p. 50).

This increase in prevalence of all types of disabilities at the preschool and kindergarten level has created a need to serve students in an array of settings. Based on The 38th Annual Report to Congress, approximately 66% of young children with disabilities are served in an early childhood program that consists of at least half of the children in attendance being considered students without disabilities (U.S. Department of Education, 2016). This national percentage of how students are served is broken down into different categories; (a) 38.2% regular early childhood programs at least 10hrs/wk and majority in the same setting, (b) 17.1% regular early childhood programs at least 10hrs/wk and majority elsewhere, (c) 5.5% regular early childhood programs less than 10hrs/wk and majority of time in the same setting, and (d) 4.9% regular early childhood program less than 10hrs/wk and majority elsewhere. Regular early childhood programs include (a) Head Start (b) kindergarten, (c) preschools, and (d) group child development centers or childcare facilities (U.S. Department of Education, 2016).

Educational Practices for Young Children with Disabilities

As the number of students with disabilities who are served in general increases and more are being served in more inclusive settings, defining what practices should be taught becomes an important topic to investigate (Underwood, Valeo, & Wood, 2012). Developmentally appropriate practices, originally identified by the NAEYC in 1986 to provide a research-based framework to

effectively educate young children (Copple & Bredekamp, 2009), focuses on core DAPs. The NAEYC (2009) published guidelines include (a) three core considerations for DAPs, (b) twelve principles of child development and learning, (c) five guidelines for effective teaching, and (d) ten suggested teaching strategies. The twelve principles include:

> (1) belief that children's development-physical, social, emotional, and cognitive are closely related; (2) development occurs in sequence; (3) development rates differs from child to child; (4) early experiences have both a cumulative and delayed effect on development; (5) development proceeds in predictable directions toward greater complexity, organization, and internalization; (6) development is influenced by multiple social and cultural filters; (7) children are active learners; (8) development results from maturing and environment; (9) play is an important component to promote social, emotional and cognitive development; (10) development advances when students acquire new skills as well as when they are challenged beyond their current skills; (11) children demonstrate what they know and learn in different modalities; (12) children develop and learn best when they feel safe and secure in an environment. (Copple & Bredekamp, 2009, pp. 9-15)

The DEC recommended practices were developed through a combination of DAPs and empirical research in the field of early intervention (Carta et al., 1991). The latest set of practices, published in 2014, include eight categories: (1) assessment, (2) environment, (3) family, (4) instruction, (5) interaction, (6) teaming and collaboration, (7) transition, and (8) leadership. Multiple sub practices are contained in these standards that incorporate the idea of promoting movement throughout the day and within educational practices, such as mathematics,

language, and other instructional time. In addition, the recommended practices include sub practices to promote effective transitions for young children with disabilities. In the category of environment, practitioners are advised to

> consider Universal Design for Learning Principles [UDL] to create accessible environments [and]… create environments that provide opportunities for movement and regular activity to maintain or improve fitness, wellness, and development across domains. (Division for Early Childhood, 2014, p. 9)

In the category of instruction, practitioners are recommended to use "embedded instruction within and across routines, activities, and environments to provide contextual relevant learning opportunities [and] use systematic instructional strategies with fidelity to teach skills and to promote child engagement and learning" (Division for Early Childhood, 2014, p. 12). Recommended practices in transition include the exchange of information among all practitioners involved, including preschool and kindergarten teachers, to positively affect the transition between settings. Yet, how those settings are different in relation to unexplored DAPs and sub practices, especially in the area of movement, have not been explained in the literature. Research in this area could help with the transition for students who struggle with movement or who have difficulty with more sedentary tasks as they move from preschool to a more academic-focused setting of kindergarten.

Teachers' preparation for young children is occurring in either traditional teacher preparation or through alternative certification programs. A discussion amongst researchers centers around the differences in preparation levels for traditionally certified teachers compared to alternatively certified teachers (Darling-Hammond, 2000; Miller, McKenna, & McKenna,

1998). Despite limited information about the effectiveness of the implementation of developmentally appropriate practices based on the type teacher preparation model the debate on which is more effective has yet to be resolved.

The Transition from Preschool to Kindergarten for Young Children with Disabilities

"Transition [in the DEC Recommended Practices] refers to the events, activities, and processes associated with key changes between environments or programs during the early childhood years and the practices that support the adjustment of the child and family to the new setting" (Division for Early Childhood, 2014, p. 15). Transition can include movement between five different types of environments based on the Recommended Practices. Those five environments include "(a) from hospital to home, (b) the transition into early intervention (Part C) programs, (c) the transition out of early intervention to community early childhood programs, (d) the transition into Part B/619, and (e) the transition to kindergarten or school-age programs" (Division for Early Childhood, 2014, p. 15).

Around the age of four, children transition from preschool settings to school-based kindergarten programs. The transition for children receiving early intervention in preschool to kindergarten is an important time in the educational programing of children with DD (Fowler, 1982; Fowler et al., 1991; Welchons & McIntyre, 2015). Welchons and McIntyre (2015) believe "the transition to kindergarten is regarded as a critical early childhood developmental milestone with important implications for later school outcomes" (p. 1).

Research on the transition process has been investigated to some degree for students in early childhood settings. Johnson and colleagues (1995) conducted a study focusing on the

delicate and manageable process of children transitioning from early intervention programs into a regular kindergarten classroom. The study consisted of 176 participants who were teachers. The participants took a survey consisting of 159 items in five developmental domains, ranking the skills young children need to have for success in the kindergarten setting based on importance. The authors found that academic skills were not ranked as important as functional skills by the teachers who participated in the survey.

In another study, kindergarten and first grade teachers completed a questionnaire provided by Rimm-Kaufman and colleagues (2000) measuring how many students had difficulty with transitioning within the classroom setting. Teachers participating in the study reported 52% of students had successful transitions, 32% had moderately successful transitions, and 16% had difficult transitions. Three of the top problems noted by the teachers in the study included difficulty following directions, lack of academic skills, and difficulty working independently (Rimm-Kaufman et al., 2000). Odluyurt and Batu (2009) built upon this work and completed a descriptive study to identify and rank the readiness skills students needed for the transition process. The results were obtained through a survey completed by 48 preschool teachers. The items ranked as having the highest priority on the survey were: "(i) attending to the group activities, (ii) following the directions, (iii) having the self-help skills, (iv) completing the motor skills, (v) expressing him/herself, (vi) paying attention to the activities, (vii) showing appropriate behaviors in the class, (viii) obeying the rules of the classroom, (ix) completing the activity appropriately, and (x) having cognitive skills appropriate for his/ her development" (p. 1845). Overall, concerns expressed for children transitioning to kindergarten across these studies

frequently related to social, behavioral, and functional skills (Odluyurt & Batu, 2009; Rimm-Kaufman et al., 2000).

Concerns also have arisen about children in kindergarten being required to spend more time on structured academic lessons and less time playing and exploring (Miller & Almon, 2009). Troup and Malone (2002) conducted a study to examine inclusive kindergarten classrooms' different ecological characteristics. One of their findings was one-third of the classrooms required children to remain seated throughout assigned activities. Research examining the different ecological characteristics, particularly movement, could impact the transition from preschool to kindergarten.

Movement

The DEC task force highlighted movement-based instruction and activities as EBPs for positively affecting children's development (Division for Early Childhood, 2014). The DEC practices emphasize the creation of environments to provide opportunities for movement to impact development in different domains, but noting instruction should be embedded across environments and activities as well as in UDL formats.

Movement for young children in schools is defined in a variety of ways in the literature: (a) physical activity that expels energy (Bouchard et al., 1994), (b) discrete physical activities, (c) integrated movement-based activities (IMBAs), and (d) brain breaks (Nalder & Northcote, 2015). Physical activity that expels energy includes skeletal muscles used to produce body movements (Bouchard et al., 1994). Discrete physical activities can include teacher or instructor-directed physical exercises, not necessarily connected to academic content. Integrated

movement-based activities are an "activity…which can be integrated into general classroom lessons, not necessarily related to physical education lessons" (Nalder & Northcote, 2015, p. 2). Brain breaks are movement-based activities that provide children the opportunity to stand up and move around during a lesson, but the movement is not always integrated into lesson components (Nadler & Northcote, 2015). These types of activities align with the recommendations made by Webster and colleagues (2015), that movement is an effective strategy to help with engagement in instruction.

Researchers are continuing to study how the integration of movement-based activities directly impacts cognitive learning and functioning, but movement does optimize and prime the brain for learning (Van, 2012). Griffen et al., (2011) identified a connection between cognitive brain functioning and exercise in young children. Researchers have identified that the cerebellum, the area of the brain linked to motor control, is directly involved in the process of learning (Middleton & Strick, 1994), and "movement enhances brain function by increasing communication between the cerebellum and the rest of the brain" (Van, 2012, p. 3). Neuroscientists are working to further explore how movement-based activities are affecting the brain (Jensen 2008), and identify if there is a connection between movement and cognition (Donnelly et al., 2016; Hillman, Erickson & Kramer, 2008).

One tool that researchers are using to study movement are accelerometers, which "provide dimensionless physical activity scores in 'counts' which are summarized over a user specified time period or epoch" (Pulsford et al., 2011, para. 9). One accelerometer is the ActiGraph Link. The ActiGraph is an accelerometer that has been proven as an effective and reliable tool to measure physical activity levels in children (Alhassan et al., 2017; Frank, Flynn,

Farnell, & Barkley, 2018; Pate et al., 2015). The impact of movement and cognition needs further investigation, but researchers have already started to make the connection that movement and physical play have a positive effect on social and emotional development of young children (Kenny et al., 2016; Lifter, Foster-Sanda, Arzamarski, Briesch, & McClure, 2011; O'Connor & Stagnitti, 2011).

Movement and Social Emotional Development

In early childhood settings, movement is primarily defined in the terms of physical play. The use of physical play in early childhood learning promotes social, emotional, cognitive, and physical development (Lifter et al., 2011; Milteer, Ginsburg, & Mulligan, 2012). For children with disabilities, physical play has the ability to foster placement, social acceptance, and participation (Lifter et al., 2011). In a study by O'Connor and Stagnitti (2011), children who received a play-based intervention showed an increase in social skills and language skills. In addition, a study by Pinchover and Shulman, (2016) highlighted how play is important for interactions between caregivers and children. Further research is being conducted to identify links between the development of social emotional skills to that of children's motor development (Kenny et al., 2016). The concept of play and movement are at the cornerstone of developmental practices (Milteer et al., 2012), but how movement is used in content area learning and the differences that exist across preschool and kindergarten for students with disabilities has yet to be explored.

Mathematics Instruction for Young Children with Disabilities

While movement is important in early childhood settings, mathematics is growing in popularity and importance. Although children begin to explore the world in the first few months of their lives, the instruction of high quality mathematics is vital for young children between the ages of three to six. At the beginning stages of learning math, children "notice and explore mathematical dimensions of their world" (Clements, Copple & Hyson, 2002, p 1). Clements (2001) outlines in preschool

> high-quality teaching in mathematics is about challenge and joy, not imposition and pressure. Good early childhood mathematics is broader and deeper than mere practice in counting and adding. It includes debating which child is bigger and drawing maps to the 'treasure' buried outside. Quality mathematics instruction includes providing loads of unit blocks, along with loads of time to use them; asking children to get just enough pencils for everyone in the group; and challenging children to estimate and check how many steps are required to walk to the playground. (p. 270)

Mathematics is to be embedded into everyday experiences while building on children's informal knowledge; for example, having "children count steps across the room or sort collections of rocks and other treasures" (Clements & Sarama, 2000, p. 38). High quality instruction of mathematics in preschool and kindergarten can come in formal structured group activities and informal experiences, but preschool and kindergarten teachers should use naturally occurring experiences to engage students in mathematics through teacher-directed instruction (National Council of Teachers of Mathematics, 2000).

The National Council of Teachers in Mathematics (NCTM) (2000) published *Principles and Standards for School Mathematics,* which describe five mathematics content strands: (1) Number and Operations, (2) Algebra, (3) Geometry, (4) Measurement, and (5) Data Analysis and Probability. The content areas are for Pre-K through 12th grade, but the content and amount is emphasized at different grade levels (National Council of Teachers of Mathematics, 2000). What should be taught at each grade level was further directed by Sarama and Clements (2009) who outlined learning trajectories in the area of (a) quantity, number, and subitizing; (b) verbal and object counting; (c) comparing, ordering, and estimating; (d) arithmetic: early addition and subtraction and counting strategies; (e) arithmetic: composition of number, place value, and multi-digit addition and subtraction; (f) spatial thinking; (g) shape; (h) composition and decomposition of shapes; (i) geometric measurement: length; (j) geometric measurement: area, volume, and angle; and (k) other content domains. These trajectories provide a foundation for the skills to introduce in early childhood settings.

In a joint position statement by the NAEYC and the NCTM (2002), mathematics is outlined as a tool to allow children to make sense of their world, but also to lay a foundation for success (Clements et al., 2002). Aunola, Leskinen, Lerkkanen, and Nurmi, (2004) discovered that children's mathematics competency later in elementary school years showed faster growth if they entered preschool with a foundation of mathematical skills. In addition, children's counting ability was the best predictor for how children were initially performing in mathematics. Jordan, Kaplan, Ramineni, and Locuniak, (2009) determined, through a longitudinal study, a strong relationship between early number competency and how children continue to perform in mathematics later in elementary school.

In early childhood education, when addressing mathematics instruction for children with DD, Odom and Wolery (2003) recommended practitioners use Evidence Based Practices (EBP). The What Works Clearinghouse (WWC) identified interventions as EBPs, including (1) Pre-K Mathematics (Klein, Starkey, & Ramirez, 2004), (2) Building Blocks for Math (SRA Real Math) (Clements, & Sarama, 2007), (3) Literacy Express (Lonigan, Clancy-Menchetti, Phillips, McDowell, & Farver, 2005), (4) Doors to Discovery (Wright Group, McGraw-Hill, 2001), (5) Ready, Set, Leap (LeapFrog SchoolHouse, 2007), (6) Curiosity Corners (Success for All Foundation, 2012), (7) Head Start, (8) Bright Beginnings (What Works Clearinghouse, 2017), (9) Ladders to Literacy (Notari- Syverson, & O'Connor, 1993), (10) The Creative Curriculum for Preschool Fourth Edition (Dodge, Colker, & Heroman, 2002), (11) Tools of the Mind (Bodrova, & Leong, 2007), (12) Direct Instruction, (13) Peer Assisted Learning Strategies, (14) Dream Box (DreamBox Learning, Inc., 2009), and (15) Teach for America (What Works Clearinghouse, 2017). Three of the identified EBPs curriculums, Dreambox, Pre-K Mathematics, and Building Blocks for Math (SRA Real Math), were identified to have "Positive or Potentially Positive Effects" (What Works Clearinghouse, 2017). The specific focus and details of these interventions and curricula, aligned with early childhood, is discussed.

Wang and Woodworth (2011) conducted a study to determine the effectiveness of the DreamBox online mathematics program. The DreamBox online program is designed for both K-2 and grades 3-5, and consists of lessons in which students use virtual manipulatives to play mathematics games and complete puzzles. This study consisted of 557 K-1 students assigned to treatment and comparison groups. The treatment group received the DreamBox mathematics

intervention every day. The treatment group made higher gains than the comparison group when assessed on the Measures of Academic Progress (MAP): Mathematics assessment.

In a study by Klein, Starkey, Clements, Sarama, and Iyer (2008), mathematics intervention was conducted with 278 children enrolled in Head Start Programs. The researchers used a randomized control consisting of components from both the Pre-K Mathematics and the DLM Express Math. The Pre-K Mathematics curriculum includes teacher-directed small group lessons that incorporate the use of manipulatives. Teachers implemented lessons from the Pre-K Mathematics such as counting numbers and understanding arithmetic operations. In addition to the small group lessons, home activities were provided to parents. In order to supplement the mathematics curriculum, DLM Express, mathematics software was used. For the children who received the intervention, their scores on the mathematics assessment significantly increased from pre to posttest.

SRA Real Math Building Blocks for Math was used in a study by Clements and Sarama, (2008). The Building Blocks intervention consisted of small group instruction, computer activities, and mathematics activities that emphasized learning with trajectories. The SRA Real Math Building Blocks is comprised of three different types of media; print, manipulatives, and technology with the goal of being integrated into a variety of activities in multiple settings. In this study, there were 36 preschool classrooms that implemented the intervention for a total of 26 weeks. After the 26 weeks, students were assessed through a mathematics achievement post-test, and the researchers were able to identify that the children in the experimental group preformed significantly greater on the posttest.

The Building Blocks and Pre-K Mathematics curriculums were effective in increasing young children's mathematics skills by using a variety of methods. The interventions both consisted of teaching students through more personalized, small learning groups; using manipulatives; integrating supplementary activities with the use of a computer; and pacing the instructions based on children's mathematics learning trajectories (Clements & Sarama, 2008; Klein et al., 2008). Beyond these mathematics programs, the status of mathematics in preschool settings and kindergarten settings for young children with disabilities is limited. The findings of these mathematical programs provide evidence that the integration of mathematics throughout the day, along with concrete manipulatives and technology, are effective strategies for teaching mathematics to young children. Yet, the way teachers integrate movement into mathematics beyond the use of manipulatives for young children with disabilities is an area with limited research.

Mathematics and Movement

How do mathematics and movement go together in the learning of young children? Riley et al., (2014) conducted a randomized control trial design to evaluate the effectiveness of a curriculum-based, physical activity program called Encouraging Activity to Stimulate Young Minds (EASY Minds). The program aimed to impact student engagement during mathematics curriculum over a six-week period. During lessons, children engaged in mathematics instruction, which also included a form of physical activity. After the EASY minds program was completed, researchers determined children's on-task behaviors in mathematics improved with the integration of movement-based activities (Riley, Lubans, Morgan, & Young, 2015). In a study

conducted by Kibbe et al. (2011), the researchers were able to determine how a curriculum designed with integration of physical activity into academic concepts impacted children. The curriculum is the TAKE10 that includes over 40 lessons that are 10 minutes each. The lessons were developed to provide children with activity breaks while integrating movement into a variety of concepts. The researchers were able to determine that the curriculum increased the amount of time children were physically active, decreased the amount of off-task time and improved reading, mathematics and spelling scores. The importance of movement is documented extensively, and the integration of movement into academic concepts continues to grow; however, the differences in movement patterns in general and how educators are incorporating movement into mathematics for young children with disabilities to better prepare them for the future is limited.

Conclusion

The transition from preschool to kindergarten is difficult for all young children, and especially students identified DD. However, simple programs and activities could help improve both transition and connections between physical movement and content mastery, especially in mathematics. The transition from preschool settings to kindergarten for young children with disabilities is important to their future success (Fowler et al., 1991; Fowler, 1982; Welchons & McIntyre, 2015). Frequently, kindergarten teachers express they have concerns with how students' social, behavioral, and functional skills affect their kindergarten experience (Odluyurt & Batu, 2009; Rimm-Kaufman, et al., 2000). Researchers are beginning to examine the potential link between these social-emotional skills and motor skills development of young children

(Kenny et al., 2016). Better understanding the amount of movement, the difference in the movement across the school day, and movement in the targeted content area of mathematics could provide the field with research about how movement differs for all students, but specifically students with DD in preschool and kindergarten settings.

CHAPTER 3: METHODOLOGY

The researcher in this chapter outlines the methodology used to investigate and compare movement and the integration of movement in mathematics, between preschool and kindergarten classrooms, for young children with disabilities. The researcher provides the purpose of the study, as well as detailing the (a) research questions, (b) research design, (c) theoretical framework, and (d) units of analysis. Further details about the research methods are described including the (a) population, (b) settings, and (c) instrumentation. The study procedures are organized into four phases; phase one, the finalization of study design and details; phase two, the processes for study approval; phase three, the process of data collection; and phase four, procedures for analyzing the data. The chapter concludes with strategies implemented to ensure validity and reliability of the study findings.

Purpose of the Study

Through the use of a mixed method research design, the researcher analyzed the data to provide robust and detailed descriptions of movement across inclusive preschool and kindergarten classrooms, as well as quantitative data to identify the difference in the amount of movement for children with developmental disabilities (DD) across the two settings (Creswell & Plano Clark, 2007). The detailed descriptions were developed through interviews, class schedule artifacts, extensive classroom and lesson observations, and teacher surveys. A multiple case study design was employed to explore how movement is different in inclusive preschool and kindergarten classrooms for young children with DD. The purpose of this multiple case study was to discover how the amount of movement in a classroom differs and how those differences

may impact young children with DD. For the purpose of this study, an inclusive preschool or kindergarten is defined as having at least two students who have an IEP, and additional inclusion and exclusion criteria is further described. The multiple sources of data collected were to discover if the amount of teacher-directed mathematics activities that integrate movement are different for young children with DD in preschool compared to kindergarten classrooms.

Research Questions

The following research questions are situated around young children with DD who attend a Head Start preschool or children with DD who attend a Title One kindergarten.

1. How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of
    a. Different teaching strategies for students with DD?
    b. Integrating movement into activities as a teaching strategy for students with DD?
2. How are practices integrated into preschool classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher directed mathematics activities?
3. How are practices integrated into kindergarten classrooms for young children with disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

4. What are the differences in preschool and kindergarten classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

Research Design

A mixed method research design was used to collect quantitative data embedded within a qualitative research approach (Creswell & Plano Clark, 2007). Through the use of a multiple case study design, as well as an analysis of quantitative data, the researcher aimed to provide a rich, thick, detailed description of the differences in classroom-based movement in preschool and kindergarten classrooms, with a separate analysis of movement in mathematics. "The distinctive need for case study research arises out of the desire to understand complex social phenomena," (Yin, 2009, p. 4) which in the case of this study, is the difference of movement in preschool and kindergarten classrooms. Each classroom was treated as separate cases during observations in the first steps of the analysis, then additional analyses were conducted to determine (a) similarities in movement and practices among preschool cases, (b) similarities among kindergarten cases, and (c) similarities and differences between preschool and kindergarten cases. Quantitative data were collected to measure the extent to which movement differs for young children with DD between preschool and kindergarten settings. The researcher also investigated mathematics activities that integrated movement in preschool and kindergarten classrooms. A survey was administered to all teachers to gather their perceptions of the importance of different teaching strategies for children with DD, including the importance of integrated movement-based activities. This information

along with teacher interviews, schedules, and lesson plans were triangulated within each case and compared across cases to ensure validity and identify themes across cases and between settings.

Propositions

In order to assist the researcher in directing attention to and exploring movement in preschool and kindergarten classrooms in a systematic, logical manner, study propositions were developed (Yin, 2009). Study propositions are a component of case study research used to more closely examine important factors of research questions. Propositions are used to direct the researcher's data collection in the right direction (Yin, 2018). The study propositions included the way that teachers' perceived instructional strategies, as well as the type and amount of movement observed in the different classrooms. Study propositions align to research questions and units of analysis to ensure appropriate data were collected to answer the research questions. The alignment of research questions, units of analysis, and propositions are provided in Table 1.

Table 1

Alignment of Research Questions, Units of Analysis and Propositions

Research Questions	Sub Questions	Unit Of Analysis	Proposition
1. How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of	a. Different teaching strategies for students with DD?	Teacher Perceptions	• Teacher perceptions of importance of different teaching strategies impact students with DD.
	b. Integrating movement into activities as a teaching strategy for students with DD?		• Teacher preparation impacts teachers' attitudes towards integrating movement in their classroom.
2. How are practices integrated into preschool classrooms for young children with developmental disabilities, related to	a. Movement in daily classroom activities?	Movement	• The types and amount of movement will be qualified as (a) physical activity (Bouchard et al., 1994), (b) discrete physical activity, (c) IMBAs, and (d) brain breaks (Nadler & Northcote, 2015) in preschool classrooms.
	b. Movement integrated into teacher directed mathematics activities?	Movement and Mathematics	• The type and amount of movement will be qualified as IMBA in teacher directed mathematics activities in preschool classrooms.
3. How are practices integrated into kindergarten classrooms for young children with disabilities related to	a. Movement in daily classroom activities?	Movement	• The type and amount of movement will be qualified as (a) physical activity (Bouchard et al., 1994), (b) discrete physical activity, (c) IMBAs, and (d) brain breaks (Nadler & Northcote, 2015) in kindergarten classrooms.
	b. Movement integrated into teacher directed mathematics activities?	Movement and Mathematics	• The type and amount of movement will be qualified as IMBA in teacher directed mathematics activities in kindergarten classrooms.
4. What are the differences in preschool and kindergarten classrooms for young children with disabilities related to	a. Movement in daily classroom activities?	Movement	• The comparison of the type and amount of movement will be qualified as (a) physical activity (Bouchard et al., 1994), (b) discrete physical activity, (c) IMBAs, and (d) brain breaks (Nadler & Northcote, 2015). • The comparison of the amount of movement is qualified by the measures and outcomes of the ActiGraph accelerometer.
	b. Movement integrated into teacher directed mathematics activities	Movement and Mathematics	• The comparison type and amount of movement will be qualified as IMBA in teacher directed mathematics activities.

Unit of Analysis

The units of analysis for this study includes (a) teachers' perceptions of the importance of different teaching strategies, including the use of integrating movement; (b) movement in the classroom; and (c) IMBAs in teacher-directed mathematics activities. Teachers' perceptions of movement as an instructional strategy were explored through multiple sources of data to determine if their perceptions of using movement is reflected in their teaching practices. Teachers' perceptions are defined as their thoughts and understandings of concepts that have been impacted from past experiences (Atkinson et al., 1987; Beijaard, Verloop, & Vermunt, 2000). Movement as a unit of analysis is defined as a physical activity of skeletal muscle that produces body movement, resulting in an increase in expelled energy (Bouchard et al., 1994), as well as "1) discrete physical activities; 2) integrated movement-based activities (IMBAs) [and], 3) activities that are commonly referred to as brain break activities" (Nalder & Northcote. 2015, p. 2). In order to study the third unit of analysis, the researcher explored the integration of movement in teacher-directed activities in mathematics, which is an explicit mathematics lesson or a naturally occurring experience where the teacher includes mathematics and integrates physical movement as part of the instructional strategy.

Boundaries of the Cases

The selection of cases began with preschool and kindergarten classrooms that included children with DD. In order to reduce confusion and ambiguity of the case, the researcher provided additional information to "bound the case" (Yin, 2009). Additional boundaries were placed to narrow the cases. The first boundary included identifying preschool classrooms that

were Head Start and kindergarten classrooms that aligned for transition in a district. These boundaries were selected due to the researcher's experience working in Title One settings, and due to the number of students with disabilities served in Head Start preschools and Title One kindergarten sites. Both the preschool and kindergarten classrooms were required to have a minimum of two students with identified disabilities and a minimum of four students without disabilities. This boundary of classrooms was to ensure the settings were inclusive. The goal of the ActiGraph data collection for students with DD was to collect movement data, with a minimum of one student and a maximum of five students per case.

Research Method

Setting(s)

The study was conducted in three different preschool, inclusive classrooms, designed to promote a variety of school readiness skills, including educational and social, for children in low-income families and for children with disabilities. Nationally, 46% of Head Start preschool programs are offered in center-based settings, five days a week, for at least six hours a day. Head Start enrollment ages include 35% of three-year-olds and 42% of four-year-olds (Head Start, 2016). In addition, this study took place in three kindergarten classrooms located in Title One schools that included young children with disabilities, ages five and six. Title One schools included at least 40% of the student population coming from low-income families. The Title One schools are designated to help "ensure all children from low-income families meet challenging state academic content and student academic achievement standards" (U.S. Department of Education, 2015, para. 1). The preschool (n=3) and kindergarten (n=3) cases were located in two different charter schools serving children with and without disabilities, ages birth to grade five,

in low income communities. School one included four participating cases: two preschool and two kindergarten. School one had a poverty rate of 79.57%, a total of 100 students and an 8:1 student to teacher ratio. School two included two participating cases: one preschool and one kindergarten. School two had a poverty rate of 72.6%, a total of 285 students, and a 7:1 student to teacher ratio.

Participants

Participants involved in the study were stakeholders at Head Start preschools and Title One kindergarten settings. Stakeholders embedded within the school cases included Head Start preschool teachers (*n*=3), Title One kindergarten teachers (*n*=3), and young children with DD or who had the label of DD before their sixth birthday (*N*=14). Teachers were required to have a state-issued teaching certificate. A total of six (*N* =6) teacher participants were included in the study. Further participant's demographics are presented in Table 2. Demographic information was identified through interviews.

Young children with disabilities in preschool included children with DD, ages three to five, and receiving early intervention services as determined by an IEP team. Young children with disabilities in kindergarten included children with DD or who previously had the label of DD before their sixth birthday, were ages four, five, or six, and receiving special education services. The exclusion criteria included students with significant motor impairments, and significant cognitive delays that would impact a students' ability to participate or move in instructional activities. A total of 14 children were included in the study, seven (*n*=7) preschool children with DD and seven (*n*=7) kindergarten children with DD. The alignment of the number of children with teacher participants are presented in Figure 2.

Table 2

Teacher Participant Interview Demographic Data

Case	Position Title	Years Taught	Grade Level	Educational Background
P1	Prekindergarten	3 months	VPK/PreK	Bachelor's Degree in Early Childhood Education and Development
P2	Prekindergarten Teacher, Team Lead	3 years	VPK/ PreK	Bachelor's Degree in Early Childhood, Minor in Exceptional Education
P3	Prekindergarten	5 years	VPK/ PreK	Bachelor's Degree in Psychology, Minor in Sociology
K1	Kindergarten Teacher	38 years	Kindergarten	Bachelor's in Liberal Studies, Minor Cross Cultural Emphasis
K2	Kindergarten Teacher	20+ years	Kindergarten	Bachelor's Degree in Retail Management
K3	Kindergarten Teacher	3 years	Kindergarten	Bachelor's in Early Childhood Education

Instrumentation

Data were collected through a variety of instruments and forms to identify teachers' perceptions and teaching practices. These tools included: (a) field protocol, (b) interview protocol, (c) classroom schedules, (d) weekly lesson plans, (e) classroom observation tools, (f) a teacher survey, and (g) ActiGraphs. In order to examine the perceptions of movement in classrooms, teachers were interviewed and surveyed using the tools provided in Appendices B and F.

A rich, detailed description of movement and the integration of movement was completed through observations of young children with disabilities. In addition, movement was described with accelerometer data, which the children wore during observations. Each classroom had a

minimum of at least one student with documented disabilities and a maximum of five students with disabilities who participated in the study (see Figure 2).

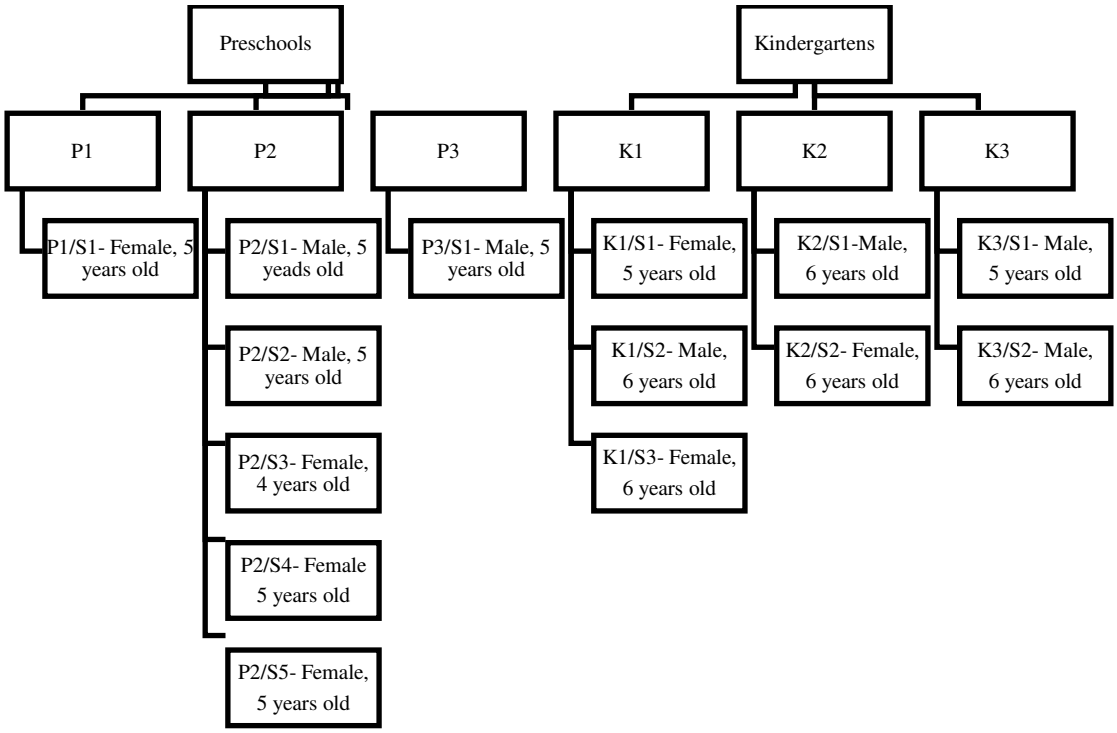


Figure 2. Alignment of the number of children with teacher participants.

Field Protocol

The field protocol is a tool to organize data collected, including daily classroom logistics, lesson plans, classroom observations, and a field journal. The field journal included the researcher's thoughts about the study and connections to cases as well as reflections of potential themes emerging. The researcher's personal thoughts and interactions with participants were logged daily in the field journal. The research study included the collection of multiple sources of data from multiple teachers/cases. In order to organize and control the collection of the data, the researcher created a data checklist provided in Appendix A.

Interview Protocol

The interview protocol included questions about teachers' formal educational backgrounds, teaching experiences, experiences with students with disabilities, and movement in their classrooms. The questions for each interview were grounded in understanding teachers' perspectives of the importance of movement integrated into their classrooms and lessons. The researcher created questions aligned with the research questions. The interview protocol is provided in Appendix B. Questions one to five include demographic information, such as "what grade do you teach?" and "what is your education background?" The answers to these questions provided the researcher with information to create a context about each case and create assumptions about how teachers' backgrounds may be connected to what is being observed in their classrooms. Questions 6-13 provided the researcher with further data about how teachers' described movement in the classroom and perceived the impact of movement on their classrooms environments.

Classroom Schedules

Teachers' classroom schedules for each case were collected and analyzed. Classroom schedules were expected to include data of the amount of time teachers spent on each activity and a list of the different activities that happened in the school day. An example of a classroom schedule artifact is provided in Appendix C. For example, P2 schedule included two columns, one with the block of time and the other with the type of activity occurring during the corresponding time. The P2 teacher's schedule included times for breakfast, journals, morning circle, exploration stations, recess, music and movement or story time, lunch, bathroom rotation, break/rest time, snack, and dismissal. For example, the K2 teacher's schedule included times for

breakfast, morning announcements, circle time, brain breaks, reading, recess, lunch, special area, mathematics, science, and reflections.

Lesson Plans

Lesson plans were collected from participating teachers during the corresponding week of observations. Lesson plans were expected to include a comprehensive description of classroom lessons. The complexity and details of lessons plans ranged based on the teacher; for example, one included a description of activities and their connection to educational standards, details related to different teaching strategies, and movement activities (if noted) throughout the day, while other lesson plans included the time of the activity and a brief description. An example of P2's weekly lesson plan is provided in Appendix D.

Observation Tool

Classroom observations were conducted with the use of an observation protocol including (a) classroom information, (b) date, (c) start and stop time, (d) classroom layout, (e) movement activities, (f) integration of movement in mathematics, and (g) reflections. Movement as an overarching unit of analysis was observed the entire school day. The observation tool was organized in 15-minute sections. To gain a detailed description of the integration of movement in mathematics, the observation tool contained a separate section for mathematic activities. To assist in observing movement, the term movement was defined as (a) physical activity (Bouchard et al., 1994), (b) discrete physical activity, (c) IMBAs, and (d) brain breaks (Nadler & Northcote, 2015). These types of movement were expected to be observed in each setting. The researcher took into account that at times, one, all, or none of these types of movement would be observed.

The observation tool also included a key for observing and coding types of movement (see Table 3). A section is included in the bottom of the observation tool for researcher reflections. The observation tool is provided in Appendix E.

Table 3

Code for Types of Movement

Movement Type	Code
Physical Activity	PA
Discrete Physical Activity	DPA
Integrated Movement Based Activity	IMBA
Brain Break	BB

Teacher Survey

The researcher developed a survey adapted from the DEC recommended practices (Division for Early Childhood, 2014). The survey was intended to provide further data about teachers' perceptions of specific instructional practices, including the use of integrating movement throughout the school day. This survey is aligned with research question one to better understand the perceptions of teachers related to the practices they see needed for students with disabilities. The survey questions were presented to teachers in a Likert scale model, with 3= very important, 2=somewhat important, and 1=not important. Based on the teachers' responses, the researcher was able to extrapolate the data and interpret it in a qualitative manner to create a profile of teachers' perceptions of the importance of different teaching strategies. For example, if a teacher rated the majority of instructional strategies as a two, the researcher was able to describe those specific strategies as of some importance to the teacher, but if the teacher rated a specific strategy as a three, the researcher was able to determine this activity was of greater importance in their teaching. The Teachers' Perception Survey is provided in Appendix F.

ActiGraphs

ActiGraphs are accelerometers that produce quantitative data to measure objective activity, including steps taken (ActiGraphs, 2017, see Figure 1, Chapter One). The ActiGraph is a noninvasive device that can be clipped to a student's belt buckle. Accelerometers are becoming increasingly popular to measure physical activity in children because the device is small, unobtrusive, and measures activity over an extended period of time (Freedson, Pober, & Janz, 2005). The reliability of the ActiGraph in measuring steps taken by children occurred with an earlier model (GT3X+ versus GT9X+). Sandroff and colleagues in 2014 using the GT3X+ counted actual steps taken by children with disabilities at various speeds (i.e., comfortable walking speed, slower walking speed, and faster walking speed) and compared their observational data to the output provided by the ActiGraph. The reliability of the data comparison ranged from 95.6%-97.4% based on the speed of the steps taken. The work of Sandroff and colleagues provides reliability data for the use of this instrument in this study. Steps taken are determined by the number of steps an individual takes in a given amount of time. For example, an individual student may take 3,000 steps over a 6-hour period in one school day. The goal was to measure each individual student's steps taken over a period of six hours a day for a total of five days. During the data collection period, some individuals missed days for a variety of reasons, such as tardiness or being picked up early. In addition, cases had early release once a week, only allowing the researcher to collect data for five hours. In order to provide a level of homogeneity across participants and cases, an average amount of time was calculated for each individual student, with all days they were at school, for a total of six hours. Further information related to step analysis of the ActiGraph is explained in the data analysis section of chapter three.

Procedures

The research design and corresponding procedures of the multiple case study follow a sequence presented by Creswell (2013), Merriam and Tisdell (2016), and Yin (2017). The researcher organized the study into four phases. Phase one included finalization of the study design and details, preparation of the IRB documents, and submission of all documents to the IRB. The IRB documents submitted for approval included: (a) human research protocol, (b) consent and assent forms, (c) recruitment flyer, and (d) study instrumentation.

In the second phase of the study, approval was first obtained by the IRB at the University of Central Florida (see Appendix G). The researcher then contacted individual schools through email communication between the director and school administration about the study. The email script used for communication is provided in Appendix H. Once study sites were identified, the researcher worked with the administrator to identify classrooms that met the study criteria. The next step included the researcher obtaining informed consent from parents/guardians and assent from the participants, as well as consent from teacher participants. An example of informed consents are included in Appendices I and J. Following the completion of the consent process, the researcher collected artifact information from participating teachers, including classroom schedules and perceptions' surveys. Before classroom observations began, interviews were conducted with all participating teachers. The researcher transcribed interviews; all participants' identities as well as confidential information (i.e., student names, school names, and district names) were omitted from the final transcription.

Phase three included classroom observations and daily reflection of observations. At the onset of this phase, an initial observation was conducted at the same time as the interview to introduce the researcher to the classroom and collect logistical data about the classroom features.

Classroom observations were conducted for a total of six weeks. The researcher observed each classroom for a total of one week. ActiGraph data were collected during the third phase of observations, and children were equipped with an ActiGraph to provide additional data of the amount of movement. An analysis of the data collected occurred throughout phase three to identify initial themes.

In the final phase, phase four, the researcher created a case context for sites P1, P2, and P3 and K1, K2, and K3, including a case description for all sites. Final themes were identified for each individual case. A cross case theme analysis, to identify similarities, were conducted to determine themes for sites P1, P2, and, P3 and then separately for sites K1, K2, and K3. Finally, an additional cross theme analysis was conducted for sites P1, P2, and, P3 as a group compared to sites K1, K2, and K3 as a group. Assertions and generalizations were created after themes were identified and are presented in chapter five. Inter-rater reliability of theme coding was conducted in phase four.

Table 4

Research Study Phases and Description

Phase	Study Procedures	Time Frame
1	• Finalize study design, procedures and details • Prepare all IRB documents • Submit all documents to the IRB	2 months
2	○ Identify cases that meet study criteria ○ Obtain informed consent from parents/guardians ○ Obtain assent from student participants ○ Obtain consent from teacher participants ○ Collect classroom schedules ○ Administer and collect teacher perception survey ○ Interview participating teachers	3 weeks
3	• Complete initial observation of all classrooms • Conduct weekly classroom observations • Collect weekly lesson plans • Assign students ActiGraphs and collect data daily • Begin initial analysis of cases to identify themes	8 weeks
4	○ Create case context and descriptions for all sites ○ Identify important phases and categories for all data sources and cases separately ○ Conduct cross theme analysis for sites P1, P2, and P3 ○ Conduct cross theme analysis for sites K1, K2 and K3 ○ Conduct cross theme analysis between P1, P2, and P3 as a group and K1, K2, and K3 as a group ○ Create assertions and generalizations ○ Conduct inter-rater reliability of coded themes ○ Write up data information	4 weeks

Data Collection Procedures

In order to improve data credibility, multiple sources of data were collected (Patton, 1990; Yin, 2003). The data collection tools included (a) interviews, (b) classroom schedules, (c) weekly lesson plans, (d) observations, (e) teacher surveys, and (f) ActiGraph accelerometers. The procedures for use of instrumentation and collection of data are provided below.

Interview Procedures

Interviews were conducted with three Head Start/VPK preschool teachers and three Title One kindergarten teachers. All interviews followed the same protocol. The researcher contacted the teachers via email to set up a time for the interview. Interviews were scheduled at a time most convenient for teachers; six interviews were conducted after school once students were dismissed and one interview was conducted at 7:30 am before the arrival of students. All interviews were completed before the scheduled observation week. All interviews were conducted at the corresponding teacher's school and in an area that was most comfortable and accessible to the teacher.

At the onset of the interview, the researcher reviewed the study with teachers and the study protocol. The researcher also explained that their identity would be kept confidential and all identifiable information would be redacted from the transcription. All interviews were audio recorded with the permission of the participating teacher. A total of 13 questions, grounded in understanding teachers' perspectives of readiness skills and teaching strategies, were asked in the interviews. Follow up and additional probing questions were included in the interviews based on participants' responses. The interviews varied in length of time based on teachers' responses and ranged in length from 10 minutes and 40 seconds to 32 minutes and 19 seconds.

The researcher with the use of audio recording transcribed all interviews. Recordings were first downloaded to the researcher's secure computer. During the transcription process, the researcher listened to the recording a minimum of five times to ensure accuracy. Once a final transcription was secured, member checking of interviews by participants was conducted to ensure validity of the interview results (Lincoln & Guba, 1985). The member checking validity process began with the researcher sending the transcription to each participant via email. Participating teachers were asked to review the interview transcription and provide comments or changes in track changes of a word document. Member checking procedures and communication scripts are located in Appendix K.

Classroom Schedules

Classroom schedules were collected from preschool and kindergarten teachers before their corresponding week of classroom observations began or before the completion of observations. Teachers were informed of the collection of classroom schedules during the introductory study meeting. An email was sent to all participating teachers to schedule an interview and collect their classroom schedules. One teacher provided her schedule at the time of the interview, while the other five, remaining teachers were asked verbally during their week of observation to provide a copy of their schedules. One teacher was emailed after her week of observations and provided an electronic copy of her schedule.

Weekly Lesson Plans

Lesson plans were collected from each teacher during their corresponding week of observations. Some teachers provided the lesson plans in hard format at the beginning of the weekly observation and other teachers provided an electronic copy through email.

Observations

Observations were conducted in three Head Start/VPK preschool classrooms (*n*=3) and three Title One kindergarten classrooms (*n*=3). An initial classroom visit and observation was conducted to gain information about the set up and classroom structure. During this initial classroom visit, interviews also were conducted with the teachers. Each classroom was observed for five days, with the exception of two cases: one of them was due to an off-campus field trip, and another for a personal reason. Hence, K1 and K2 were observed for 4 total days. The classroom observation schedule is outlined in Table 5. Daily observations were conducted Monday, Tuesday, Thursday, and Friday from 8:30 am until 2:30 pm, a total of six hours. On Wednesdays, observations were conducted from 8:30 am until 1:30 pm, a total of five hours, due to weekly early dismissal. The observation protocol was used during each visit to ensure the researcher was collecting the appropriate data. All observation notes were written in narrative form in 15-minute time blocks, consecutively. Observation notes were hand written to not distract students in the classroom with technology (i.e., computer and iPads). During the observations, the researcher noted if specific types of movement occurred (see Table 3). Once observations were completed, the researcher typed notes daily into a word document and added reflective notes in track changes.

Table 5

Classroom Observation Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	P1	P1	P1	P1	P1
Week 2	P2	P2	P2	P2	P2
Week 3	---	K1	K1	K1	K1
Week 4	K2	K2	K2	K2	----
Week 5	K3	K3	K3	K3	K3
Week 6	P3	P3	P3	P3	P3

Teacher Survey

The researcher-created survey was administered to preschool and kindergarten teachers at the onset of the study, before the classroom observations began. However, the data were not analyzed until the observations were concluded, to decrease any potential research bias that may have occurred during the observation period from survey results.

ActiGraph

An ActiGraph was assigned to each student participating in the study at the beginning of their observational period. The ActiGraph was placed around the student's waist when they arrived to the classroom before the start of the daily classroom observations. While the student wore the ActiGraph accelerometer, data were collected as frequently as 60-second intervals, and the output presented in different scales of measurement based on what was being measured (John & Freedson, 2012). For example, steps taken was measured, and a ratio measurement of the number of steps was presented in 60-second intervals once the data were downloaded. The researcher collected the ActiGraph data at the end of the weekly observation period by docking

the ActiGraph into a docking station connected to the computer. A measure of steps taken was presented in 60-second intervals and documented in total amounts for each day that the student was present for a total of six hours. Students were removed from the study if they missed more than three full school days in the one-week observation period.

Data Analysis

The analysis of data was guided by the researcher's questions and alignment with the propositions. Data analyses were conducted based on the connection of data collected to each research question (see Table 6).

Table 6

Correlation of Research Questions to Data

Research Questions	Sub Questions	Data
1. How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of	a. Different teaching strategies for students with DD?	Interviews Teacher Survey
	b. Integrating movement into activities as a teaching strategy for students with DD?	Interviews Teacher Survey
2. How are practices integrated into preschool classrooms for young children with developmental disabilities, related to	a. Movement in daily classroom activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans
	b. Movement integrated into teacher directed mathematics activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans
3. How are practices integrated into kindergarten classrooms for young children with disabilities related to	a. Movement in daily classroom activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans
	b. Movement integrated into teacher directed mathematics activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans
4. What are the differences in preschool and kindergarten classrooms for young children with disabilities related to	a. Movement in daily classroom activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans ActiGraph
	b. Movement integrated into teacher directed mathematics activities?	Interviews Observations Classroom Schedules Weekly Lesson Plans

Data analyses involved the following procedures: (a) creating a case context for sites P1, P2, and P3 and K1, K2, and K3 individually; (b) creating a case description for sites P1, P2, and P3 and K1, K2, and K3 individually; (c) using categorical aggregation to analyze the information

collected from data sources (Creswell, 2007); (d) conducting a within-case analysis and identifying categories; (e) seeking collection of instances from data to determine similarities and differences in an across-case theme analyses for sites P1, P2, and P3 as a group and K1, K2, and K3 as a group (Creswell, 2007, p. 163); (f) comparing themes from sites P1, P2, and P3 to themes from sites K1, K2, and K3; and (g) creating assertions and generalizations.

Conducting data analyses to identify themes required the use of multiple sources of data for each research question. The researcher conducted the analyses in a systematic manner by examining one source of data at a time aligned with each question as noted in Table 6. Once all data were coded and analyzed, the next step included triangulation of the patterns and categories that emerged from the multiple sources of data (Baxter & Jack, 2008). A complete flow chart of the data analyses procedures is presented in Figure 3.

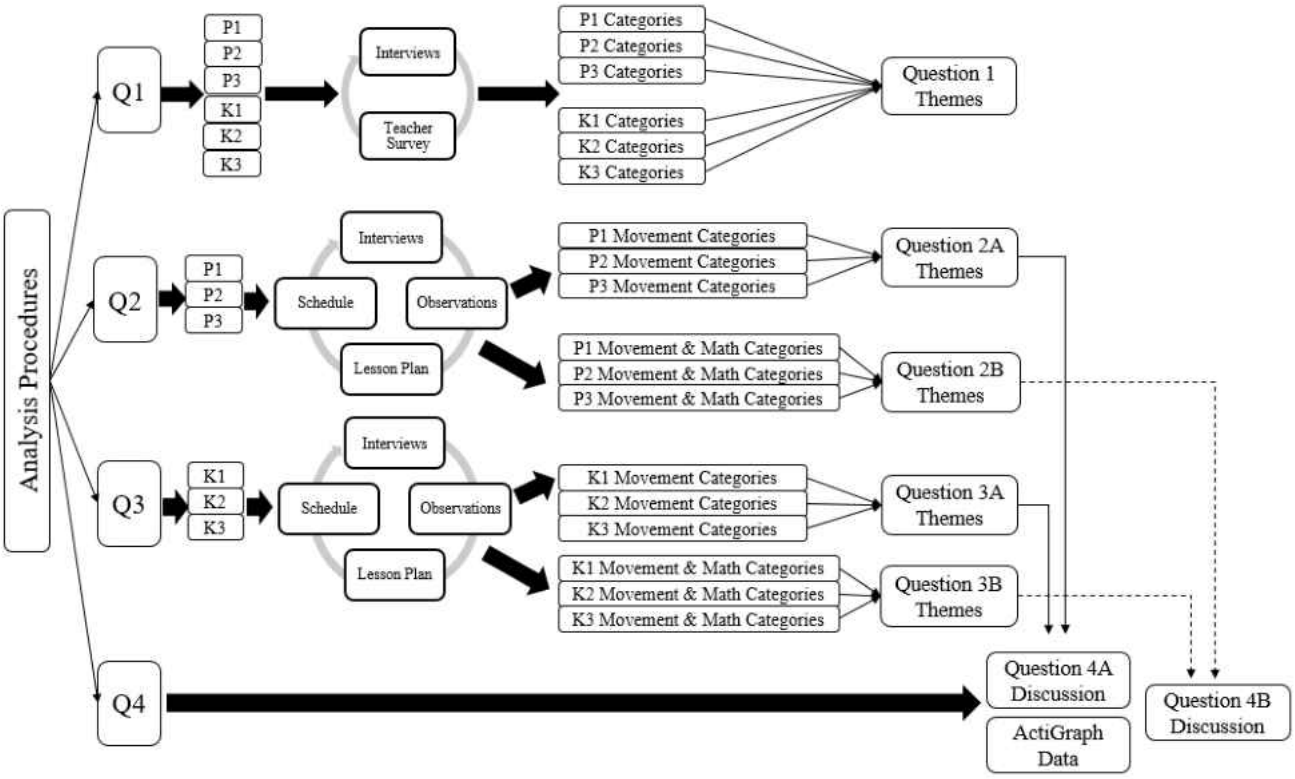


Figure 3. Data analysis flow chart.

Figure 4 provides the template for triangulation of patterns of categories of analysis for each data source to answer research question one. Analysis of interviews and teachers' surveys were conducted for each case to identify categories to derive case themes. The procedures for deriving categories from individual data sources are provided. Once all derived data were entered into Figure 4, the researcher then completed a narrative analysis provided in chapter 4.

	A	B	C	D	E	F	G
1	**Case**	**Data Source**	**Important Phrases Words**	**Categories**	**Common Categories**	**Cross Case Themes**	**Debriefer Comments**
2	P1	Interview					
3		Survey					
4	P2	Interview					
5		Survey					
6	P3	Interview					
7		Survey					
8							
9	K1	Interview					
10		Survey					
11	K2	Interview					
12		Survey					
13	K3	Interview					
14		Survey					

Figure 4. Data triangulation for research question one.

Figure 5 provides the template used for triangulation of categories identified from each data source to answer research questions two and three. An analysis of interviews, observations, classroom schedules, and lesson plans were analyzed for each case to answer research questions two and three.

	A	B	C	D	E	F	G
1	Case	Data Source	Important Phrases Words	Categories	Common Categories	Cross Case Themes	Debriefer Comments
2	P1	Interviews					
3		Observations					
4		Classroom Schedules					
5		Lesson Plan					
6	P2	Interviews					
7		Observations					
8		Classroom Schedules					
9		Lesson Plan					
10	P3	Interviews					
11		Observations					
12		Classroom Schedules					
13		Lesson Plan					
14							
15	K1	Interviews					
16		Observations					
17		Classroom Schedules					
18		Lesson Plan					
19	K2	Interviews					
20		Observations					
21		Classroom Schedules					
22		Lesson Plan					
23	K3	Interviews					
24		Observations					
25		Classroom Schedules					
26		Lesson Plan					

Figure 5. Data triangulation for research questions two and three.

The results of research questions two and three were compared to answer research question four. The results of the ActiGraph accelerometer are presented in research question four to provide additional evidence. Analysis procedures for each individual instrument are presented below. The data collected from individual instrument analysis procedures were organized into Figures 4 and 5.

Instrument Analysis Procedures

Interviews

The interview analysis followed a nine-step process that included (1) conducting the interview; (2) transcription of interview; (3) identifying significant words, statements, or phrases;

(4) category construction; (5) category sorting; (6) naming the themes; (7) descriptive narrative; (8) theoretical context and linking themes; and (9) member checking. The interview analysis procedures were developed based on the processes presented by Merriam and Tidell (2016) and Creswell (2013). Further description of each analysis step is presented in Table 7.

Table 7

Interview Analysis Procedures

	Step	Description
1	Conduct Interview	The researcher set up a time accessible by the participant to conduct the interview.
2	Transcription Of Interview	The researcher created a written transcription of the interview.
3	Identifying Significant Words, Statements Or Phrases	The researcher read each interview transcription, jotted down notes, comments, phrases. Notations were made with answering the research question in mind (Merriam & Tidell, 2016).
4	Category Construction	The researcher created initial categories based on significant notations created. The researcher reread all interview transcriptions and began to label potential categories (Merriam & Tidell, 2016).
5	Category Sorting	The researcher sorted identified phrases from all cases into selected categories. During this step, the researcher "check[ed] whether categories derived from earlier data hold up" as all the interviews are analyzed (Merriam & Tidell, 2016, p. 210).
6	Name The Themes	The researcher created names of clustered categories based on what was observed throughout the data collection period. "The actual names of… categories/themes/findings [will] come from at least three sources (or a mix of these sources): (1) the researcher, (2) the participants' exact words, or (3) sources outside the study, most likely from the literature" (Merriam & Tidell, 2016, p. 211).
7	Descriptive Narrative	The researcher created a descriptive narrative of categories answering each research question with supporting details, words, statements, and phrases.
8	Theoretical Context And Linking Themes	The researcher attempted to link the categories together to provide a more meaningful description while also making a connection to theoretical underpinnings. (Merriam & Tidell, 2016). The linking of categories were represented in a visual form (Creswell, 2013).
9	Member-Checking	The researcher returned back to the participants to obtain feedback, comments, and suggestions related to the categories derived from the interview transcription (Creswell, 2013).

Data from interviews were organized into an excel file to facilitate a structured analysis of individual cases as well as a cross case analysis. The excel file was organized into columns that included (a) important individual case phrases, words, etc.; (b) individualized case categories; (c) cross-case common categories; (d) cross-case themes; and (e) descriptions of themes (see Figures 4 and 5). This process was used to answer research question one. Steps three through five of the interview analysis process also were used to answer research questions two and three.

Observations

Classroom/case study observations analysis followed a five-step process that included observation analysis procedures presented from both Creswell (2013) and Yin (2017). The process includes (1) reading through all observational notes to identify important notes, (2) rereading the observational notes to create categories based on important notes, (3) organizing/sorting categories across cases to develop common themes/ patterns, (4) developing narrative interpretation of themes, and (5) presenting an in-depth description of themes and connection to research question two and three. An excel file, similar to the one created for the analysis of interviews, was used in the analysis of observations (see Figure 5). The excel file was organized into columns that included (a) important individual case phrases, words, etc.; (b) individualized case categories; (c) cross-case common categories throughout multiple data sources; (d) cross-case themes; and (e) descriptions of themes (see Figure 5). This analysis procedure and tracking process was used for both analyzing the data aligned for movement in general (Q2A and Q3A) as well as movement and mathematics (Q2B and Q3B).

Class Schedules & Lesson Plans

Teachers'/participants' class schedules, along with their weekly lesson plans were analyzed following data analysis procedures presented by both Creswell (2013) and Yin (2017). The researcher analyzed the artifacts by first reading through both the class schedules and lesson plans for each teacher/participant individually. The next step included identifying important phrases and words related to research questions one and two. These key phrases and words were inputted into the excel file that also included data analysis results from the interviews and observations (see Figure 5). The researcher then began the process of sorting phrases into common categories. The common categories included key phrases and words from both the interviews and the observations. This analysis procedure and tracking process was used for both class schedules and lesson plans to analyze the data related to movement (Q2A and Q3A) as well as movement and mathematics (Q2B and Q3B).

Teacher Survey

The results of the survey were used to answer research question one. The degree to which teachers rated specific teaching strategies helped the researcher better understand perceptions of teachers. If a teacher ranked an item with a one or a three, the researcher made narrative notes in the data analysis spreadsheet. Further descriptions of survey results are described in narrative format in the results chapter.

ActiGraph Data Analysis

To answer research question five, data were entered into spreadsheets to track individual students' amount of movement, as well as an average amount for each case. An individual

student amount included the total for each movement measurement (i.e., steps taken) over a six-hour school day. Students' physical activity was recorded between three to five days. Due to absences, tardiness, and early dismissals, an average amount of time was calculated for each individual student including all days they were at school for a total of 6 hours. Individual students' amounts were entered into a spreadsheet along with a class average amount. A measurement of steps taken was recorded for individual students per class and combined for the class average. An average score of each measurement was recorded for cases P1, P2, and P3 and cases K1, K2, and K3. The average of each movement measurements of preschool cases (P1, P2 and P3) was compared to the average of each movement measurements for kindergarten cases (K1, K2, K3). The data comparing each movement measurement for preschool and kindergarten cases is depicted in a graph in chapter four of this study, along with further narrative information of the results.

Validity and Reliability Measures

A variety of strategies were implemented to ensure validity and reliability of the study outcomes, including (a) clearly written research questions, (b) clear explanation as to why the multiple case study approach is appropriate, (c) sampling of cases were made in a purposeful manner, (d) a variety of data sources were collected and managed in an effective manner, (e) the data were analyzed in a systematic research based manner (Russell, Gregory, Ploegg, DiCenso, & Guyatt, 2005), and (f) repeated observations of cases were conducted and noted. An additional strategy employed to secure trustworthiness of data sources to confirm findings was triangulation (Knafl & Breitmayer, 1989). Member checking of the interview transcripts was employed. A peer debriefer was used to check the researcher's findings for each research question (Creswell

& Miller, 2000). Measures to ensure validity and reliability are addressed in the following section.

Use of Multiple Case Study Approach

To ensure findings from the study were generalizable across Head Start preschools and Title One kindergarten classrooms, multiple cases were observed. To ensure reliability across cases; interviews, observations, and collection of ActiGraph data followed the same procedural guidelines, described in the data collection procedures section.

Multiple Data Sources/ Triangulation

By collecting multiple sources of data for each research question, the researcher was able to complete triangulation of data. Through the process of triangulation, the researcher provided a higher level of credibility as well as ensuring that all aspects were studied in an exhaustive manner (Creswell, 2007).

Repeated Observations of Cases

Repeated observations of each case were conducted to gain a detailed understanding of movement in the classrooms. Classes were observed for a total of four to five days with the observations spread out over a six-week period (see Table 5). Multiple observations occurred to eliminate the chance of an instance being observed was a phenomenon.

Member Checking

Member checking was conducted to provide additional validity of the teacher interviews (Brantlinger et al., 2005). Teachers were asked to review the interview transcriptions and provide comments related to any conflicting information collected. Each teacher received an email with the instructions, in which they were asked to complete in a word document with track changes. This step was a critical component to establish credibility (Lincoln & Guba, 1985).

Inter-Rater Observer of Coding

Inter-rater reliability (IRR) was conducted by a peer debriefer, which provided a measurement that reported the consistency of coding from all data sources. The peer debriefier was sent an excel file of (a) all identified important phrases and words for each case, (b) categories for each case, (c) themes for preschool cases, and (d) themes for kindergarten cases. The peer debriefer was asked to provide comments if they disagreed with identified categories and themes, as well as provide further rationale for their decision (see Appendix L for inter-rater reliability steps). The peer debriefer had access to all original data sources if they needed to reference information for clarification. The peer debriefer also was asked to look at Accelerometer data and identify if the researcher correctly transferred the correct amounts into the spreadsheet along with if correct calculations of average amounts were completed.

Role of the Researcher

To provide another layer of reliability and validity to the study, the researcher provided a detailed description of her experience and background. This information allowed the researcher to be aware of how her own personal experience and bias may affect the interpretation of data,

how the data would be analyzed, and how the results would be discussed (Merriam, 1988). A detailed description of the role of the researcher follows.

Researcher Statement

I am a biracial (African American and Caucasian) female who grew up in Saudi Arabia and Bahrain. I attended a diverse British School until the age of ten. At ten-years-old, my family moved back to Darlington, South Carolina. At this time, I found myself in an elementary school with limited diversity. It was at this time in life that I began to feel excluded and an outsider. At the age of 15, I began working at a summer camp for children and young adults with physical and cognitive disabilities. Through this experience, my connection to, and understanding of children with disabilities blossomed, and I decided that the best way to serve this community was to pursue a bachelor's degree in special education.

My bachelor's degree led to a six-year teaching career in a variety of settings. Those settings included teaching students in preschool and kindergarten who were diagnosed with disabilities. As a kindergarten teacher of students with disabilities, each year, I would have students transition to my classroom from preschool settings. My teaching experiences were in Title One schools that were more often than not feeder schools from Head Start programs.

In order to qualify the researcher as a valid 'human instrument,' the researchers' assumptions and expectations are outlined below (Lincoln & Denzin, 2003; Greenbank, 2003). In my experience, when young children with disabilities transitioned to my classroom for kindergarten, they had difficulties with staying in their seat, walking appropriately in the hallway, and following directions. My assumptions were their behaviors were linked to a decrease in opportunities to move around. When comparing my instructional day to preschool, I

would often complete more table work, and recess was only provided once a day (compared to the preschool that attended recess twice a day). Students were expected to be engaged in lessons for a longer amount of time than in preschool. My expectations for the study are that movement will be more prevalent in preschool classrooms. In regards to the integration of movement into different instructional lessons, I believe it will look more structured in kindergarten than in preschool, and even less movement may be occurring during mathematics or instructional time.

CHAPTER 4: DATA ANALYSIS AND RESULTS

Introduction

In this chapter, the researcher presents the findings of a mixed method research study to examine the use of movement in preschool and kindergarten classrooms for young children with disabilities. A multiple case studies approach was used to determine themes of (a) teachers' perceptions and (b) similarities and differences in use of movement in preschool and kindergarten classrooms, and (c) the integration of movement and mathematics across these two early childhood educational settings. Perceptions of teaching strategies identified by preschool teachers about the integration of mathematics and movement are provided. Five themes emerged from preschool cases and three themes across kindergarten cases. These themes are provided along with reliability findings.

The following research questions were used to guide the analysis of the data and to share the results of this study:

1. How do Head Start preschool teachers and Title One Kindergarten teachers perceive the importance of:
    a. Different teaching strategies for students with DD?
    b. Integrating movement into activities as a teaching strategy for students with DD?
2. How are practices integrated into preschool classrooms for young children with DD, related to:
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

3. How are practices integrated into kindergarten classrooms for young children with DD, related to:
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?
4. What are the differences between preschool and kindergarten classrooms for young children with disabilities, related to:
    a. Use of movement in daily classroom activities?
    b. Integration of movement into teacher-directed mathematics activities?

This chapter is organized first by presenting the case context and description for each site/classroom. The case context and descriptions provide further details on each case, including information about teachers and students, along with a description of the physical set up of their classrooms. Presented next are the data analysis procedures aligned with each research question and sub-question. Specific words, participants' quotes, and narrative observation notes are provided with each research question to support the identified themes.

Case Context and Description

A case context and description is outlined below for all classrooms. The study included a total of six classrooms, three preschool settings, and three kindergarten settings. All classrooms had between 12-16 students, with two assistants and one certified early childhood teacher. Both teacher and student participants' information are included in the case description of each classroom, along with further details about the setting. Teacher participant backgrounds are provided in Table 2, Chapter 3.

P1

Participant P1 was a pre-kindergarten teacher with three months of teaching experience. P1 received her bachelor's degree in early childhood education and development. The P1 teacher expressed during the interview that the majority of her classes for her undergraduate degree were focused on the development of children and not so much on subjects, such as reading (Interview, 3/27/2018). While working on her bachelor's degree, she worked as an Assistant Director for a private daycare company, and before that she worked as a Director for an organization that provided after school care for children.

The P1 classroom contained an area to the left for book bags and nap blankets. Continuing along the back, left wall was a sand table and a door to the bathroom. To the right, was a rectangle table with two bookcases turned outwards and a second rectangular table. In front of the tables was a rug with letters surrounding the edge and a SmartBoard on the front wall. In the back, front corner of the room was a kitchen and dress-up area. The room also contained cabinets and a sink across one wall, a small library area, and a Lego manipulatives area.

One student from the P1 class participated in the study by wearing the ActiGraph accelerometer. The student was a five-year-old female. She was described, by her teacher, as calm and consistently able to follow directions. The student was receiving early intervention services in the classroom and speech services for DD.

P2

Participant P2 was a pre-kindergarten teacher with three years of teaching experience in inclusive preschool settings. She began her degree at one university, majoring in both elementary

and early childhood education along with a double minor in psychology and exceptional student education. After two years at that university, she transferred to a new college and graduated with a bachelor's degree in early childhood education with a minor in exceptional education. She is currently pursuing her master's degree in exceptional education. The P2 teacher expressed during the interview that during her undergraduate studies she had a course in early childhood mathematics, and while a lot of what she learned is difficult to apply in preschool, she enjoyed what she learned from the class (Interview, 4/2/2018). The teacher also expressed that during her graduate studies, she recently read a study discussing how movement is good for children in different classroom settings (P2, Interview, 4/2/2018). Participant P2 described her desire to work with children in exceptional education because of her personal experiences of having an IEP in school as well as an experience she had as a teacher cadet in high school.

The P2 classroom had two, large tables with six to eight chairs at each table. When students walked in the room, their cubbies were located to the right on the back wall. Located to the left was a bookcase separating the back of the room from the middle and front. In front of the bookcase were two large tables. A large, blue class rug with letters around the edge was located at the front of the room, with a SmartBoard located directly in front and a projector hanging overhead.

Five students (three girls and two boys) from the P2 case participated in the study by wearing the ActiGraph accelerometer. All of the students were receiving early intervention services for DD.

P3

Participant P3 was a preschool teacher who taught four and five-year-old students. She had five years of teaching experience and a bachelor's degree in psychology with a minor in sociology. She completed testing to receive certification for teaching. Participant P3 completed an internship in a school setting while working on her bachelor's degree, and after graduating, worked a few years in animal training. After deciding to make a career change, she got a job as a lead teacher assistant (LTA) and shortly after, decided to get her certification as an early childhood teacher. The P3 teacher received her early childhood certification through an alternative certification route, and therefore, the interview questions about educational experience were related to professional development. When asked about different professional development courses, the teacher expressed most were not focused on working with students with disabilities, but she has had basic training in Picture Exchange Communication System (PECS) (P3, Interview, 3/26/2018).

The P3 classroom was the largest space of all the preschool classrooms. When entering the classroom, the teacher created a play area with bookcases to the left of the door, and to the right when you first walk in was the bathroom. Along the same wall was the entrance to the teacher's office. Straight ahead from the entrance of the classroom was an area created for circle time with a large rug and a SmartBoard on the wall. On the opposite side of the classroom from the SmartBoard were four computers on one rectangular table and a semi-circle, small group table. In the far, back left corner was another area for free play. Towards the far back wall in the middle was a sink along with a door to the outside garden area. The back, right corner contained a wall of cubbies along with a refrigerator and nap cots stacked on a sand table.

Two students (one male and one female) began participation in the study by wearing the ActiGraph accelerometer. The female student was removed from the study because she did not meet the required number of days of attendance for wearing the ActiGraph. Therefore, the data collected from this participant was not included in the analysis, and only data from the male student in the classroom was analyzed. This student had an IEP for DD.

K1

The K1 kindergarten teacher described herself as having 38 years of teaching experience. She started working at the age of 16 in a daycare setting. While working in the daycare setting, she earned a bachelor's degree in liberal studies and a minor with a cross-cultural emphasis. She has worked in a variety of educational settings such as Christian, private, public and now inclusive school programs. The teacher received her certification through an alternative certification route and was working in the classroom setting for less than a year as a certified teacher when the study commenced. When the K1 teacher was asked about the different types of education professional development, she mentioned "I've taken professional development courses throughout the years related to different subject areas," but she did not go into depth about the content of her professional development courses related to content (Interview, 4/4/2018).

The K1 class included a wall of cubbies, to the right, when walking into the room. On the same wall was a bookcase with different writing utensils. After the bookcase was the door to the bathroom. To the left, after entering the room, was a mini, rectangular table that sat six students. Three additional tables of the same size followed, creating an L-shape of tables. In the front, left

corner was a rug and the SmartBoard. In the far back corner was a teacher desk, and along the wall with windows was a small group, half circle table.

A total of three students (one male and two females) from the K1 class participated in the study. The teacher described all the students selected as wanting to be engaged in a variety of physical activities and described the male student as staying seated in activities unless the teacher directed him to move. One of the female students, the teacher noted, would frequently get up and move around at any time she chose. All three students had an IEP and were receiving special education services for DD.

K2

The K2 kindergarten teacher had over 20 years of experience. She began her career in retail management after earning her bachelor's degree. She made the transition to teaching after she had her first child and had teaching experiences across multiple grade levels. In order to obtain her teaching certificate the K2 teacher stated she was required to "go back and take classes, 36 hours in education," and she is constantly taking professional development courses (K2, Interview, 4/6/2018). The teacher mentioned one of the classes she was required to take was "in elementary education in reading, language development, reading and language, math, science and social studies as well" (K2, Interview, 4/6/2018). While the K2 teacher mentioned her educational training was in multiple developmental areas, she did not go in depth as to how or if the classes included information about movement as a teaching strategy.

When entering the K2 classroom, to the right were four computers placed underneath the SmartBoard along the wall. In front of the SmartBoard was a rug. Along the same wall was the entrance to the bathroom. In front of the bathroom were the cubby bookcases in an L-shape,

blocking the bathroom from view. In the remaining part of the room were four circle tables that could seat up to six students. In one of the back corners was a half circle, small group table that seated three students. In the other back corner was a small table and a small bookcase the teacher made into a desk area.

Two male students in the K2 classroom participated in the study. One student was observed to frequently find opportunities to get up out of his seat throughout the day (i.e., multiple bathroom breaks, helping to clean up pencils, and passing out lunch). The other student was only observed getting out of his seat if instructed by a teacher. Both students had IEPs and were receiving special education services for DD.

K3

The K3 kindergarten teacher had five years of teaching experience, two years in preschool, and three years in elementary. The teacher had his degree in early childhood education and was in the process of obtaining his master's degree in education. One of the teacher's internship experiences inspired him to pursue the exceptional education track in the education field. During the interview, the K3 teacher mentioned that during his undergraduate training, he was fortunate enough to have a class related to movement in early childhood education. During that class he said he learned about "how movement affects children's learning" (Interview, 3/28/2018). He said that he cannot remember having a particular class related to teaching mathematics to young children, but what he does remember learning is that mathematics should be embedded throughout the day (K3, Interview, 3/28/2018).

When walking into the K3 classroom, there was a mini hallway lined with a tall storage unit and bookcases. The students hung their book bags on hooks outside the classroom. After the

mini hallway, the room was set up in an L-shape. First, was a semi-circle table on top of a butterfly number rug. To the right was another semi-circle table on top of a leopard print rug. Next, were two small tables put together to make a large table that seated six students. At the end of the L was another set of tables seating six students. In front of the L was a rug made up of squares with letters. In front of the rug was the SmartBoard, along with a teacher desk and a white board easel.

Two students from this classroom participated in the study by wearing the ActiGraph accelerometer. The teacher described the students as typical kindergarteners in regards to the amount of movement they engaged in daily. Both students were boys and both receiving special education services for DD.

Research Question One

The first research question addressed in the study was, "How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of (a) different teaching strategies for students with DD?, and (b) integrating movement into activities as a teaching strategy for students with DD? In order to answer this question, teacher interviews and the teacher survey were analyzed. While teachers' surveys were analyzed, responses did not vary; therefore, teacher interviews provided a more descriptive analysis of teachers' perceptions. For example, one survey statement and the DEC recommended practice stated "Practitioners create environments that provide opportunities for movement and regular physical activity to maintain or improve fitness, wellness, and development across domains" (Division for Early Childhood, 2014, .p. 9). On this question all teachers who returned their survey ranked this a three, implying that they perceive it's important to implement movement in their classrooms. Again, because the

survey responses did not provide individualized and detailed information the teacher interview responses provided a more descriptive understanding of teachers' perceptions. In order to gain information about teachers' perceptions of different teaching strategies, including movement for students with DD, teachers were asked questions such as "What type of instructional strategies do you use in your teaching?" or "What does movement look like in your classroom?" The interview questions provided a foundation for the discussion and additional follow up questions (i.e., "Do you believe that movement helps their engagement?") were asked based on teachers' responses.

The main themes that emerged from the preschool (P1, P2 and P3) cases included the integration of mathematics throughout multiple content areas was perceived to be more effective in preschool for children with DD, and preschool teachers shared movement not only helps with engagement; but when movement activities occur, music should be played (see Figure 6). The main themes for the preschool cases were derived from common/overlapping categories among all three preschool cases. Only one main theme emerged within the kindergarten (K1, K2 and K3) cases: modeling is an effective strategy for teaching students with DD (see Figure 6). This theme was derived from categories that overlapped among all three kindergarten cases. No themes emerged from these teachers in relation to mathematics and movement.

Additional categories emerged for individual cases, with some overlapping between two cases. When conducting the original case analysis, these categories did not overlap with neither all three preschool cases nor all three kindergarten cases, and therefore, these singular or dually focused categories were identified and are presented in Table 8 for preschool and in Table 9 for kindergarten cases. Evidence identified within each additional category are located in Appendix M and N. These additional categories that emerged about instructional strategies are presented to

provide a more in-depth description of individual teachers' perceptions of instructional strategies and movement for students with DD. The color blue is used in the text for preschool cases and data analysis, and red is used for kindergarten cases.

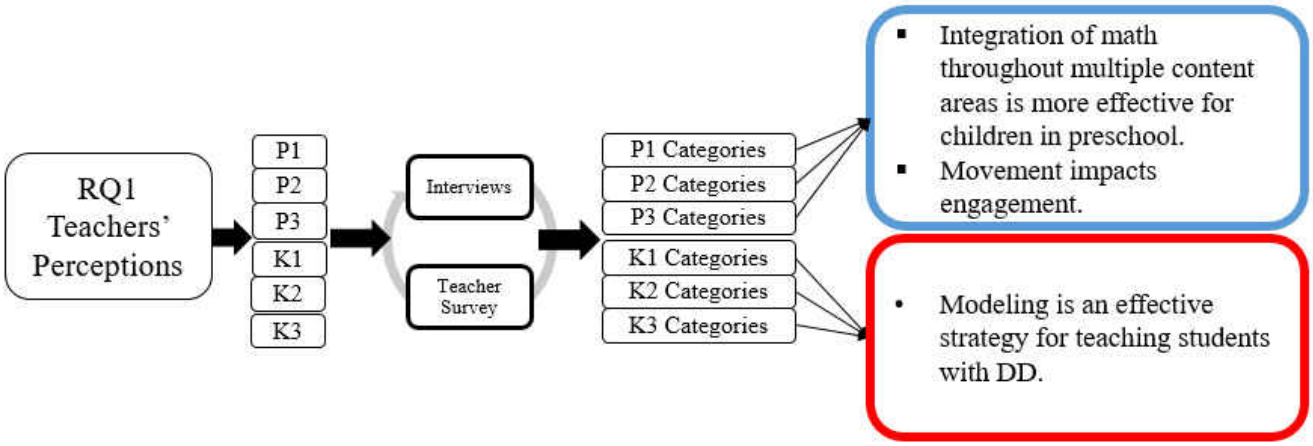


Figure 6. RQ1 Preschool and kindergarten themes.

Themes and Supporting Preschool Evidence

Evidence is provided to support each of the two main themes that emerged after conducting an across-case analysis of preschool classrooms. Teacher statements to support the theme of the importance of integration of mathematics throughout the instructional day for students with DD, and how movement has the possibility to impact student engagement, are provided.

Integrated Mathematics

One of the main themes that emerged was the use of integrated mathematics activities in preschool cases. The teachers expressed they do not sit down and conduct an explicit mathematics lesson because they integrate this content throughout the day and in multiple

activities. The P1 preschool teacher stated, “I don't sit and do a direct math lesson” (Interview, 3/27/2018).

When the P1 preschool teacher was asked further about why mathematics is integrated more throughout the day compared to a directed mathematics lesson, P1 stated, “Because I feel like it's really hard for them… if I don't do it that way” (Interview, 3/27/2018).

All preschool teachers expressed that mathematics is best taught to their students when it is integrated throughout the school day. The P1 preschool teacher stated:

> I'm working on the adding with them. It's been a little bit challenging because… for instance…this week our theme is spiders. So, today [I] was… explaining to them how many legs a spider has, and… one of my kids [said] four. And I [said]… well, there's four on one side and four [on] the other side. And [I said]… how many? I'll try to get them to … count. So [those are]… the little things I do. I feel like I incorporate math as much as I possibly can. (Interview, 3/27/2018)

When the P2 preschool teacher was asked if there was a specific time in the schedule for mathematics, she responded, “the general gist of our centers on Monday is math concepts…It ends up all kind of being integrated, depending on what it is” (Interview, 4/2/2018). When asked to describe what mathematics looks like in her classroom, the P3 preschool teacher outlined how she was teaching mathematics concepts during her literacy instruction. She stated:

> We started out with, we're doing authors and illustrators. So, we did Pete the Cat and its four groovy buttons. So they did that. They got to move around with the song. And, then, I got bears and…we actually did subtraction using the concrete objects. (Interview, 3/26/2018)

Movement, Engagement, and Music

Another main category that emerged among preschool teachers was how the use of movement impacts engagement. Teachers noted a connection between movement and engagement to music. When the preschool teachers were asked to describe what movement looks like in their classrooms, they all expressed they find movement to be important for their students, and provided an abundance of examples of how they use movement throughout their day. When the P2 preschool teacher was asked how movement affects the overall environment of her classroom, she responded:

> I think it definitely helps. I read a study this past summer when I first started about movement in the classroom, actually, and how much research studies are proving that it's good for kids; and that it's helping their brain focus. Definitely, if we move, I notice a big difference in their focus afterwards. Even sometimes, I'll just turn [the] timer on, and we'll run in place for 20 seconds or something. And I noticed that they're able to sit still and focus more as long as I'm not jumping between things too quickly. (Interview, 4/2/2018)

When asked the same question, the P3 preschool teacher responded:

> The movement is fantastic. And if they're engaged…it affects everything in the best way possible. That's when they really learn things. If they're fully immersed in it and they're actually able to … [use] themselves and making things… with their bodies. It affects everything they do… it helps them actually concentrate, which seems like it should go the opposite way. (Interview, 3/26/2018)

In addition, when discussing movement, all of the preschool teachers provided responses that linked the use of music in their classroom to the times they are integrating movement. While it appears that preschool teachers perceive that movement is linked to engagement, they also perceive the movement and music are linked. When the P1 preschool teacher was asked to describe what movement looks like in the classroom her response was, “So lots of music, lots of music. So, like I told you [in the] morning, we’ll always do an action song” (Interview, 3/27/2018).

The P2 preschool teacher, when describing her schedule mentioned, “We do music and movement” (Interview, 4/2/2018). She went on further to describe times she uses movement and music together: “Sometimes, I can tell if they really need to get their wiggles out. We'll do a good morning song. Jack Hartman has a bunch of different morning songs that we do. They love him” (Interview, 4/2/2018).

Yet, while the P3 preschool teacher made a connection between movement and music, she also stated that the two together have a negative impact on her classroom:

> I would say when… [movement] affects negatively is when there is music on because certain types of music. Like... the soft or the classical music…. slower music is good, but any time that it's like, even the Pete the Cat Song, any kind of even academic song, even if it's a fun thing…. it ramps them up too much and then they just kind of go away… They're more interested in dancing and almost like knocking into each other than they are interested in what's being said. (Interview, 3/26/2018)

Themes and Supporting Kindergarten Evidence

A different theme emerged from kindergarten cases. Evidence is provided to support the one, main theme that emerged after conducting an across case analysis of kindergarten classrooms. The main theme, central across kindergarten cases, is teachers perceive that modeling is an effective strategy for teaching students with DD. This theme is supported by teacher statements. While two of the teachers talked about the use of movement as an instructional strategy, one described movement as an effective tool for focus (K1, Interview, 4/4/2018), and one as an important strategy to use (K3, Interview, 3/26/2018). All three of the teachers did not express movement as being an important or effective instructional strategy; therefore, no main themes were identified across all kindergarten cases (K1, K2, and K3) related to how teachers' perceive the importance of movement as an instructional strategy.

Modeling

The one main theme that emerged across all three kindergarten cases were that teachers perceive modeling is an effective strategy for teaching children in kindergarten with DD. When the teachers were asked what instructional strategies are important to use in their classroom, they all stated 'modeling'. K1 said, "modeling. We model a lot and repetitive. A lot of things are repetitive and modeling" (Interview, 4/4/2018). The K2 kindergarten teacher said, "Oh we definitely do the modeling. That's… an everyday thing with all the kids. Modeling, yes, that's a plus" (Interview, 4/6/18). The K3 kindergarten teacher said, "a lot of teacher modeling. It does [help], when they're paying attention" (Interview, 3/28/2018).

Outliers

Presented below in Table 8 are singular or dually identified categories that emerged from one or two of the preschool cases and in Table 9 of kindergarten cases. The presented categories did not emerge across all cases of preschool or kindergarten cases, so they were not identified as themes. Although these categories do not overlap among all three preschool cases or all three kindergarten cases, the rationale for presenting them in the analysis is to provide a rich, thick, detailed description of additional strategies the teachers' identified and perceived as important for working with young children with DD and in the area of movement. Evidence of each of these categories is presented in Appendix M and N.

Table 8

Singular or Dually Identified Categories of Preschool Teachers' Perceptions

Category	Explanation	P1	P2	P3
Independence	Teachers perceive that it is important to teach young children with DD strategies for being independent.	✓		
Transitions	Teachers perceive that transitions between activities in the classroom are opportunities for movement for students with DD.	✓	✓	
Individualized	Teachers perceive it is important to make sure work is individualized for students with DD, and one-on-one instructional time can benefit them.		✓	✓
Manipulatives/ Concrete Objects	Teachers perceive manipulatives and concrete objects are an effective strategy for teaching mathematics to students with DD.		✓	✓
Visuals	Teachers perceive that using visuals during lessons helps students with DD.		✓	✓

Table 9

Singular or Dually Identified Categories of Kindergarten Teachers' Perceptions

Category	Explanation	K1	K2	K3
Open-Ended Questions	Teacher perceives open-ended questions can help students with DD learn.	✓		
Consistency	Teachers perceives a consistent schedule is important for students with DD.	✓	✓	
Structure	Teacher perceives structure helps reduce confusion and helps students with DD.		✓	
Visuals	Teachers perceive visuals are an effective strategy for instructing students with DD.		✓	✓
Movement and Focus	Teachers perceive movement is important and can help with focus for children with DD.	✓		✓
Manipulatives	Teachers perceive manipulatives are an effective strategy for teaching mathematics to students with DD.	✓	✓	

Research Question Two

The second research question addressed in the study was "How are practices integrated into preschool classrooms for young children with developmental disabilities, related to: (a) movement in daily classroom activities, and (b) movement integrated into teacher-directed mathematics activities?" In order to answer this question, teacher interviews, classroom observation notes, classroom schedules, and lesson plans were analyzed and triangulated to determine themes. Five main themes were identified related to movement in daily classroom activities. The five main themes include: (1) use of videos with music for movement, (2) literacy movement, (3) physical transitions, (4) fine motor activities, and (5) free play movement (see Figure 7). One main theme was identified related to movement integrated into teacher-directed mathematics activities. The main mathematics and movement theme includes use of

manipulatives that require fine motor movements (see Figure 7). All main themes were derived from a cross case analysis of preschool classrooms (P1, P2 and P3).

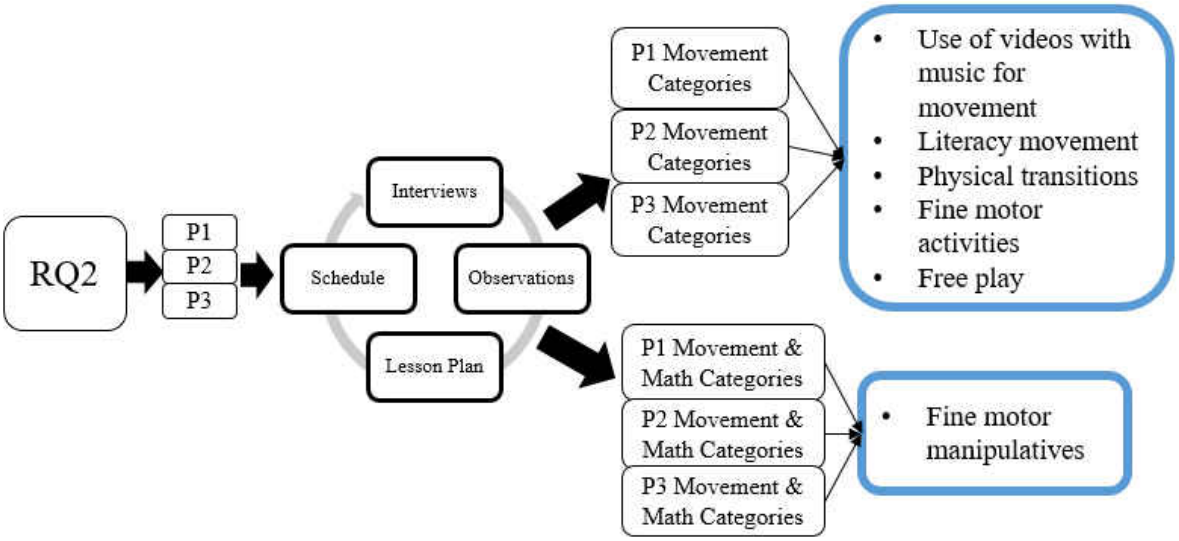


Figure 7. RQ2 A and B preschool themes.

RQ2A Preschool Movement Themes and Supporting Data

Five main themes emerged across all three preschool cases through an analysis and triangulation of interviews, observations, classroom schedules, and lesson plans. The five main themes include: (1) use of videos with music for movement, (2) literacy movement, (3) physical transitions, (4) fine motor activities, and (5) free play movement.

Theme One: Use Of Videos with Music for Movement

During their interviews, all preschool teachers mentioned using music and movement in their classrooms. In addition, lesson plans provided evidence about when music and movement were occurring. During the observations of all three preschool classrooms, the researcher was

able to make the connection that when music and movement were occurring, it was connected to a video displayed on the electronic/interactive white board.

When discussing the schedule of the classroom, P1 teacher mentioned, after reviewing circle time content, she would "usually show some type of…movement video" (Interview, 3/27/2018). Over the five days of classroom observations in the P1 preschool class, videos with music were used multiple times to elicit movement from the children. The teacher would direct students to the front carpet located by the interactive white board, or if already on the carpet, she would direct students to stand up before beginning the music movement video. An example of one of the videos instructed students to "wiggle wiggles away and clap your crazies away." Students would shake their hips back and forth, shake their arms, jump up and down, and exaggerate their clapping while participating in the video (P1, Observations, 4/4/2018).

The analysis of the P2 preschool teacher's classroom schedule noted a fifteen-minute music and movement section. The P2 teacher's lesson plan also stated "Teacher-led music and movement. Jack Hartman, Go Noodle, Just Dance Kids, [and] Cosmic Kids Yoga." These music and movement sections presented in the schedule and lesson plans were observed with the addition of a video, multiple times in the classroom observations of the P2 preschool case (Observations, 4/9/2018-4/13/18). Before starting the music movement videos, the teacher would give a verbal transition such as, "everybody stand up. Time to move" (P2, Observations, 5/7/2018). The teacher would then start a video. While the videos used varied from day to day, there was one constant dance video that directed students to move like robots.

While the theme, music movement videos, was not as prevalent in the P3 preschool classroom, it still emerged. The P3 teacher played a music movement video to the children's song "Jump!" In this song, children are instructed to jump repeatedly, then lay down and dream

of rainbows, then jump repeatedly, then stretch and take a deep breath, and finally jump repeatedly before the song ends.

Theme Two: Literacy and Movement

The use of movement in literacy activities emerged as a theme across all preschool cases. While the majority of instances included more fine motor and upper body movements, there were some examples of total body movements. The P1 and P2 preschool classrooms both integrated 'Zoo Phonics' into their daily routines. Zoo Phonics included teaching students the letters of the alphabet, along with the sounds of each letter. All of the letters had a corresponding animal and movement. For example: A for alligator, open and close arms like a chomping alligator; D for deer, hold arms up and position hands by head for antlers; G for gorilla, pound chest; I for inchworm, move one finger in and out; J for jelly fish, lift arms and wiggle fingers in the air; and K for kangaroo, pumping arms and hands in fists in the air (P1 and P2, Observations).

In addition in the P2 classroom, the teacher played zoo phonics bingo, requiring the students to use fine motor movements to move the bingo chips (Observations, 4/10/2018), and played 'fly swatter identifying' in which students would take a fly swatter and smack the correct zoo phonics card when called (Observations, 4/13/2018).

The P3 preschool teacher, during her interview, stated, "We also have… 'who has cards'… so they each get a card and one of them says… 'I have cat, who has hat?' and then they have to move over to whoever has [the matching card]" (Interview, 4/13/2018). The use of the 'who has cards' was observed being used in the classroom to pair compound words together. For example, the teacher called on the student who had the word cup, they stood up, and then she called on the student who had cake, and that student stood up. The teacher then directed the

students to go stand beside each other, and asked the entire class to verbally put the two words together. They responded, “cupcake” (Observations, 5/7/2018).

Theme Three: Physical Transitions

Physical transitions was another theme that emerged throughout all preschool cases. Physical transitions refer to opportunities that allowed movement to occur when moving throughout the classroom, school, or from one activity to another throughout the day. When teachers expressed how movement is used in their classroom, they all provided rationale for why they have their students physically transition frequently throughout the day. The preschool teachers provided examples that they perceive students should not be sitting still for extended amounts of time, and the use of transitions between areas in the classroom allowed opportunities for movement throughout the school day (P1 and P2, Interviews).

During the interview, when talking about transitions throughout the day, the P1 teacher expressed, "I feel like that…helps them. Rather than table to table, back to table, or just on the rug, like the physical act of…now it's time for me to move to the rug" (Interviews, 4/2/2018). During observations, the teacher frequently directed students to make multiple physical transitions throughout the day. The students began their day at a table, then to the rug for check in, back to the table for breakfast, next to the rug for circle time, then after circle time they would transition to different areas of the room for centers. This pattern continued throughout the day. When transitioning, students would walk, skip, hop, and at times spin before making their way to the next area. The P1 students were observed making physical transitions anywhere between 11-15 times a day.

The P2 preschool teacher expressed that she has planned her schedule to “try to make it so [students are not] sitting for too long in one location” (Interviews, 4/2/2018). The students of

the P2 case were observed physically transitioning between 13-18 times a day. The P2 teacher incorporated a response and call routine with her students for transitions from the table to the rug. The routine included the teacher asking a question, then the student responding while completing the action. For example, teacher says, “one, what are we doing?” Students responded, “sitting” while they sit quiet. The teacher then said, “two, what do you do? Stand up....”, students responded, “push in chairs,” and completed the action then stood by their chairs. In the final step of the routine, the teacher said, “three, what do you do?”, students responded, “walk to rug” (Observations, 4/11/2018).

While the P3 classroom was observed to physically transition less (i.e., 8- 12 times daily) than the other two preschool cases, some of the physical transitions were longer and provided students more opportunities for movement. For example, the P3 classroom physically transitioned to the cafeteria every morning for breakfast, while the other cases ate in their classrooms. Students would collect lunch boxes, walk to a number, and stand on the number by the door. They then walked through the school to the cafeteria where they would sit at a table to eat.

Theme Four: Fine Motor

A fourth theme that emerged was the use of fine motor activities that required the use of minor movements. Some fine motor activities included drawing, cutting, maneuvering tweezers and pinching clothespins.

Examples of fine motor activities in P1 included: lacing shoe strings around animal outline shapes and tracing glue lines with yarn to create spider webs (Observations, 4/3/2018). In the P2 case, fine motor was introduced in the lesson plan as an exploration station. The exploration station would include ‘writing- name practice, white boards, writing sentences with

sight words'. Every day, the teacher in the P2 case directed students in a journaling activity, focused on their fine motor skills; Monday - writing or tracing letters of the alphabet, Tuesday - writing or tracing name, Wednesday - drawing butterflies, Thursday - drawing ants, and Friday - choice drawing (Observations, 4/9/2018-4/13/2018). During centers, students frequently participated in fine motor activities; for example, cutting out pictures of insects to match pictures.

Students in the P3 case were observed participating in a fine motor activity when they first arrived to the classroom before free play. Students would sit at table and trace the letter of the day, along with circling the letter and then coloring the letter (Observations, 5/7/2018-5/11/2018). The teacher also integrated fine motor activities throughout the center time; for example, students went to Mr. Potato Head centers and necklace making centers (Observations, 5/11/2018).

Theme Five: Free Play Movement

The final theme that emerged across preschool cases was free play movement. Free play movement was observed frequently in all three cases and included a variety of center time play activities (i.e., puzzles, trains, cars, Legos, kitchen, building blocks). Free play was observed in the three preschool classrooms anywhere between one to four times a day. During these free play movement opportunities, students participated in a variety of fine motor movements to whole body movements.

In the P1 case, free play movement occurred daily at three different times of day: morning centers, afternoon centers, and after naptime. The free play movement in this classroom included: kitchen, blocks station, animal figures, and dress up. During the kitchen time, students were observed pretending to cook food by putting pans in the oven, washing dishes in the sink,

and stirring cookie mix in a bowl. Students moved freely in the kitchen area, bending down to get pretend food off the shelf, and walking back and forth from the dinner table to the stove. During the blocks stations, students were required to stay in a designated area but could move freely in that space. Students would crawl around picking up blocks, sit on knees and stack blocks, and as the tower got taller, they would stand up to stack more. When the structure fell, students would jump up and down expressing excitement. When playing with animal figures, students would imitate animals, for example a dog, and they would be on their hands and knees moving around the carpet, wagging their pretend tails (P1, Observations, 4/2/2018- 4/6/2018).

In the P2 classroom, free play movement was observed two to three times a day: once students finished eating breakfast, morning center time, and after snack time in the afternoon. Examples of free play movement in this case included the kitchen area, cars, Legos, and trains. During Legos, students began by sitting on the front carpet putting the Legos together. As they continued stacking the blocks, they would stand up to be able to reach to the top. When playing with trains, students would be on their hands and knees pushing a train around the edge of the carpet or crashing one of their trains into a friend's train (P2, Observations, 5/7/18- 5/11/2018). The P2 preschool teacher also included a section of her lesson plan devoted to free play time; "Free play: writing table (w/crayons, markers, pencils, dry erase), blocks, dramatic play, and books associated to the weekly theme."

Free play movement occurred less frequently in the P3 preschool room, between one to two times a day. While free play was observed in the P3 case and was similar to that of the other two preschool cases, building with blocks and cars, an additional type of free play movement observed was the gardening center. The classroom had a small, fenced in grass area connected to the side door of classroom. During center time, the students had the opportunity to go outside

and water the plants they had planted. Students would collect their mini watering cans from the shelf, fill them up with water at the sink, and then walk outside to water a plant (P3, Observations, 5/9/2018).

RQ2B Preschool Movement and Mathematics Themes and Supporting Data

While observing movement in preschool cases and analyzing additional data sources for movement opportunities, the researcher was also examining how movement was integrated in teacher-directed mathematics activities. Mathematics in the preschool cases presented itself as mini, integrated lessons or activities throughout the day instead of whole group, direct mathematics instruction. One main theme was derived in relation to the integration of movement into mathematics in preschool cases. The main theme present across all preschool cases (P1, P2, and P3) involved the use of manipulatives that require fine motor movements. Other categories emerged in relation to the integration of movement and mathematics. These five categories did not appear across all three preschool cases to create a theme; however, the categories did overlap between two cases. These categories are presented in Table 10 to provide a further detailed description of how movement was integrated into preschool classrooms for children with DD, and evidence of the categories in cases is presented in Appendix O.

Theme One: Fine Motor Manipulatives

The one, main theme of how preschool teachers integrate movement into teacher-directed mathematics activities was the use of manipulatives that require fine motor movements. All three preschool cases had evidence of activities that required students to use their fine motor skills (i.e., pinching clothes pin, placing peg pieces) to engage with different manipulatives (i.e., colored toy bears, bingo chips) in order to participate in a mathematics activity.

The P1 preschool teacher described during her interview, "[I have] these lily pads I made, and I have these toy frogs… and all the lily pads have a number on them. And that's how many frogs they have to put on" (Interview, 3/27/2018). Additional evidence emerged during the P1 case observations. The teacher had students complete the lily pad counting activity during centers, along with a die counting activity. The teacher would roll the die to students, and then they would take their pointer finger and count the number of dots on the top of the die.

In the P2 cases, there was strong evidence of this theme. First, when the teacher was interviewed and asked about how she integrates movement into her mathematics activities, she mentioned "bingo games to hands-on manipulatives" (Interview, 4/9/2018). During the case observations, students participated in a variety of fine motor, manipulative mathematics activities during small group center rotations. During one matching activity, the students had clothespins with numbers written on them, along with counting bug cards. The students had to count the number of bugs on a card and clip the corresponding numbered clothespin to the card (Observations, 4/9/2018). Another fine motor manipulative activity included the use of a bowl of different color bear manipulatives, corresponding colored bowls, and large tweezers. The objective of the activity was for students to sort the color bears into matching colored bowls, using the tweezers and not their hands (Observations, 4/12/2018).

The P3 case also used fine motor manipulatives during mathematics activities. Unlike the other cases that completed these activities during small group center rotation, this case completed some of these activities as part of the circle time routine. For example, while reviewing colors during circle time, the teacher pulled out colored bear manipulatives and handed them to students, asking a variety of questions. The teacher went around the circle and asked students

individually to pick up a particular color. For other students, she would hand bears while saying "I have one bear, and two bears join. How many do I have?" (Observations, 5/8/2018).

Additional Categories

After conducting an across case analysis of the three different preschool cases (P1, P2 and P3), one main theme emerged and five additional categories surfaced from individual cases, but not across cases in relation to the integration of movement and mathematics. These five categories overlapped between two of the cases, or were only identified for a single case, and therefore were not identified as a theme. These additional categories are presented to provide a further detailed description of how movement was integrated into preschool cases for children with DD (see Table 10). Additional evidence for each category is located in Appendix O.

Table 10

Singular or Dually Identified Categories of Movement and Mathematics in Preschool Cases

Category	Explanation	P1	P2	P3
Fine Motor	Teachers integrated activities into mathematics instruction that required students to use fine motor movements, but did not include any type of manipulative.	✓	✓	
Total Body Response	Teachers had students participate in mathematics activities moving entire body in response to a question.	✓		✓
Upper Body Manipulatives	Teachers integrated activities into mathematics instruction that included manipulatives and required students to use movements from their waist up.	✓	✓	
Upper body	Teachers integrated activities into mathematics instruction that required students to use movements from their waist up, but did not include any type of manipulatives.	✓		✓
Math Movement Videos	Teachers used a video during mathematics activities that directed students to preform movements in connection to mathematics subjects.		✓	✓

Research Question Three

The third research question addressed in the study was, "How are practices integrated into kindergarten classrooms for young children with disabilities, related to: (a) movement in daily classroom activities, and (b) movement integrated into teacher-directed mathematics activities?" To answer this question, teacher interviews, classroom observation notes, classroom schedules, and lesson plans were analyzed and triangulated to determine overarching themes. The three main themes related to how movement was integrated in daily classroom activities included: opportunities for movement through physical transitions, movement during special areas (i.e., art, physical education, and music), and fine motor activities. The main mathematics

and movement theme that emerged was the use of fine motor movement occurring when students were asked to write in their mathematics workbooks (see Figure 8). No other themes emerged. All main themes were derived from a cross case analysis of kindergarten cases (K1, K2 and K3).

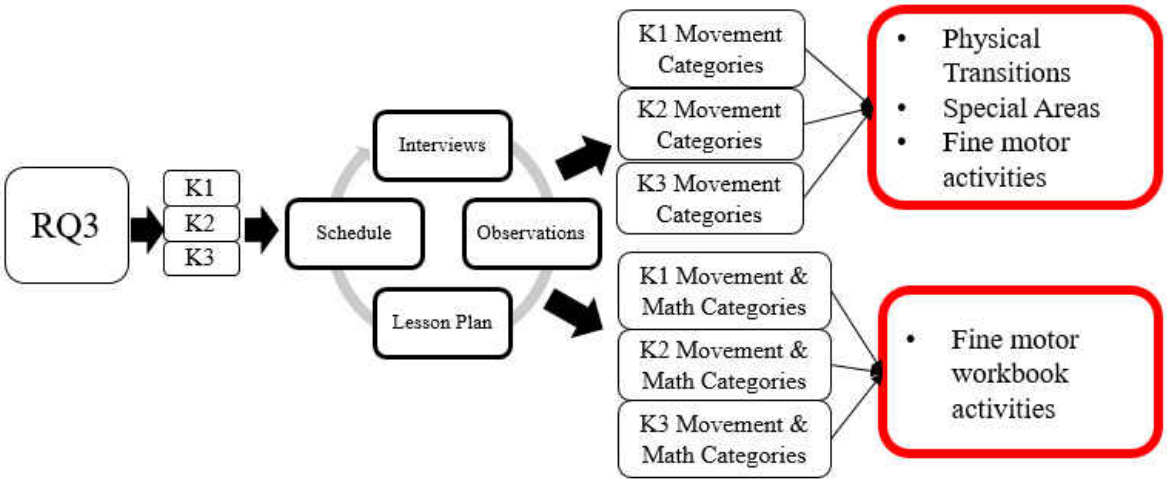


Figure 8. RQ3 A and B kindergarten themes.

RQ3A Kindergarten Movement Themes and Supporting Data

Three main themes emerged across all three kindergarten cases through an analysis of interviews, observations, classroom schedules, and lesson plans. The three main themes included: (1) physical transitions, (2) special areas, and (3) fine motor movements.

Theme One: Physical Transitions

Physical transitions emerged as a common theme among all kindergarten cases. Physical transitions refer to opportunities that allowed movement to occur throughout the classroom, school, or from one activity to another throughout the day. While the teachers did not mention the use of transitions for movement opportunities during interviews, this theme was observed frequently during classroom observations.

In the kindergarten K1 case, students were observed physically transitioning throughout the day an average of 11 times. The K1 teacher frequently directed physical transitions through songs that included directed movements. For example, when physically transitioning to story time, the teacher sang, “I have a story. It belongs to me. If you turn around and sit back down, I will let you see,” while the students followed along to the movements (Observations, 4/17/2018).

The students in the K2 cases were observed making physical transitions an average of nine times a day. Transitions in the classroom occurred approximately three to four times during centers, as well as transitioning outside to the playground. While in the classroom, the students were not observed transitioning to the rug for activities except for when waiting to wash hands for lunch. The students transitioned between tables to complete tabletop work (Observations, 4/23/2018-4/26/2018).

Students in the K3 case were observed making physical transitions an average of 11 times a day. While the teacher did not implement any transition songs or sayings, the students would frequently transition between the table and the carpet during center time, as well as from the carpet to the table during morning social studies and reading time. The K3 teacher also allowed students to transition to the back of the room to move around and take a break, if needed (Observations, 4/30/2018-5/4/2018).

Theme Two: Special Areas

Another theme that emerged across all kindergarten cases was special areas. Special areas refer to the times a specials teacher instructed the students in physical education (PE), art, or music. This instruction for music and art occurred in their home classroom, but PE occurred outside, weather permitting. While the special area activities were not taught by the classroom teacher, during these times, the students engaged in a variety of movement activities. Since the

PE time was primarily physical movement, it provided a higher level of physical engagement that is not currently incorporated into the preschool setting. Both sites had recess, but only the K1 case had formalized PE time.

The K1 case engaged in PE multiple times during one week. During PE, students were observed engaging in a variety of gross motor activities such as running races, kicking a soccer ball, and ducking down and side stepping while playing dodge ball (Observations, 4/17/2018 and 4/20/2018).

The K2 case was observed participating in PE and art. During PE, the students engaged in a variety of gross motor activities. The K2 case attended PE twice during a one-week observation period (Observations, 4/23/2018 and 4/25/2018). The art teacher came to the classroom and instructed students one time per week and had students engaged in fine motor movement activities. Students first began the lesson by coloring a butterfly with crayons while focusing on symmetry. The lesson continued with students receiving a card stock butterfly folded in half, cups of primary color paint, and popsicle sticks. The students took the popsicle sticks, scooped up some paint, and gently splattered the paint on the butterfly. Students then took the card stock butterfly, folded it in half, and pressed and rubbed across to spread the paint around inside (Observation, 4/24/2018) to help them understand the concept of symmetry.

The K3 case was observed participating in both PE and music. Music occurred twice a week while PE occurred once a week. While in PE, the students participated in relay races by dribbling a ball down the sidewalk to a cone and then back to the next person in line, as well as a race holding a racket while balancing a small ball (K3, Observation, 5/2/2018). During music, the teacher engaged all students in a warm-up activity that included gross motor movements. The teacher would direct students to make an animal sound to warm up their voice and do a

corresponding movement. For example, “flap your arms like an eagle while cawing like a bird” or “swing arms by your side like a monkey while saying ‘ooh ooh ooh aah aah ahh’ (K3, Observations, 5/3/2018 and 5/4/2018).

Theme Three: Fine Motor

The third theme identified across kindergarten cases was fine motor movements. The theme of fine motor movements was categorized based on activities students completed that required the use of minor movements with fingers and/or hands.

Fine motor movements were observed most frequently during center time in the K1 case. Examples of the fine motor activities included completing worksheets that required students to fill in a missing letter (K1, Observation, 4/17/2018), matching a sight word card puzzle (K1, Observation, 4/18/2018), and the use of rubber bands and peg boards to create letters (K1, Observation, 4/19/2018). The K1 teacher also used fine motor activities during whole group science and social studies; for example, she handed out paper and crayons and directed students to draw spiders (i.e., a circle for the body, eight legs, and the eyes), (K1, Observation, 4/19/2018).

In the K2 case, the teacher used fine motor activities in morning centers, afternoon centers, and during whole group mathematics. While learning about the life cycle of a caterpillar, the teacher handed out a paper with a depiction of the life cycle of a caterpillar, directed students to write their names, and then allowed the students time to color the life cycle of a caterpillar (K2, Observation, 4/23/2018). Later in the week, the students continued working on the life cycle of a caterpillar by completing a worksheet that required students to perform a cutting task (K2, Observation, 4/24/2018).

During observations, the K3 teacher implemented a social studies or reading activity in the morning that was typically followed by a worksheet. For example, if the students were learning about landforms, the teacher had them complete a worksheet where they had to cut out the pictures of landforms, match them to the correct word, and then glue the picture down. If the students had time, they were allowed to color the pictures (K3, Observation, 5/1/2018).

Additional Categories

After conducting the across case analysis of the three different kindergarten cases, three main themes emerged. Four additional categories emerged in relation to the integration of movement in kindergarten cases. These four categories only occurred between two of the cases and are described in Table 11.

Table 11

Singular or Dually Identified Categories of Movement in Kindergarten Cases

Category	Explanation	K1	K2	K3
Brain Breaks	Directed physical activity that does not include a video or music.	✓	✓	
Movement Music Videos	Teachers had students participate in mathematics activities moving entire body in response to a question.	✓		✓
Individuals	Teachers direct one to four students to complete an activity that requires movements, but not all the students have an opportunity to engage in the movement.	✓	✓	
Circle time	Movement directed by the teacher, a video or song during circle time activities.	✓	✓	

RQ3B Kindergarten Movement and Mathematics Themes and Supporting Data

Mathematics instruction in kindergarten cases was structured as a whole group, teacher-directed lesson, typically followed by small group mathematics rotations. During this time, one main theme was observed across all kindergarten cases. This theme related to how movement was integrated into teacher-directed mathematics activities for students with DD, consisting of fine motor movements when writing in their mathematics workbooks. No other common themes emerged.

Theme One: Workbook Fine Motor

The theme of workbook fine motor movements occur when students were engaged in fine motor movements (i.e., cutting, drawing, writing, and gluing) while completing a mathematics activity in a workbook. All three kindergarten cases used "Go Math," (Burger et al., 2015), a curricular program that has a corresponding workbook.

The K1 case was observed using the workbooks during center rotation. The students completed the worksheets with pencils. The students were observed, one time, coloring objects in their workbooks. The students in the K2 case also were observed signing their workbooks during mathematics center rotations. Students used pencils to fill in answers to workbook activities. Similar to the K1 and K2 cases, the K3 case also used the Go Math workbook. But in the K3 case, the teacher used the workbooks during whole group instruction.

Additional Categories

Although only one main theme was identified across all three cases, additional categories did emerge during the cross case analysis. These categories did not emerge in all cases but were identified for one to two of the cases. These additional categories were mathematics movement

videos, interactive technology, total physical response, and fine motor manipulatives. These categories and explanations are presented in Table 12.

Table 12

Singular or Dually Identified Categories of Movement and Mathematics in Kindergarten Cases

Category	Explanation	K1	K2	K3
Interactive Technology	Teachers integrated technology into instructional activities that required students to participate in the technology with either fine or gross motor movements.	✓		
Movement Music Videos	Teachers used a video during mathematics activities that directed students to preform movements in connection to mathematics subjects.	✓		✓
Total Physical Response	Teachers integrated whole body movements in instructional activities that required students to participate through total physical responses.		✓	✓
Fine Motor Manipulatives	Teachers integrate movement in to activities that include the use of manipulatives that require fine motor movements.		✓	✓

Research Question Four

The fourth research question addressed in this study was, "What are the differences in preschool and kindergarten classrooms for young children with disabilities, related to: (a) movement in daily classroom activities and (b) movement integrated into teacher-directed mathematics activities?" In order to answer this question, triangulation of themes, teachers' perceptions, and ActiGraph results were compared across preschool and kindergarten cases. Differences and similarities are discussed in narrative format of the one main mathematics and movement theme that emerged from the preschool cases compared to the kindergarten cases.

ActiGraph Data

Quantitative data were collected on both preschool students with DD and kindergarten students with DD through the use of an ActiGraph accelerometer. A physical activity measurement of steps taken was collected to provide quantitative data to describe one aspect of the differences in movement for preschool and kindergarten students with DD.

Description of Preschool

The researcher examined three preschool cases with a total of seven student participants. The differences in numbers of students whose steps were measured in each case varied (P1 – 1 student, P2 – 5 students, P3 – 1 student) based upon the number of students identified as DD in the class, the willingness of parents to allow their child to wear the ActiGraph, and the attendance of a student. Although this difference in where children were situated is a limitation discussed in Chapter 5, the variety of students wearing the ActiGraph in the preschool cases paralleled the children who wore this device in the kindergarten cases (e.g., student who was compliant, moved at all times, were spontaneous to reserved in willingness to move). Therefore, results are presented below of individual student's average steps in 30-minute increments, average daily steps, average steps per minute, and the average steps per minute excluding the time for nap in preschools. Nap time was removed to normalize the data as no movement occurred during this time.

Steps

On average, students with DD in preschool took 3,518 steps per day, and on average, 9.77 steps per minute. An additional analysis of the data was conducted to exclude the amount of time students spent sleeping and not engaged in movement during nap. With the exclusion of

naptime, students with DD in preschool took, on average, 11.865 steps per minute (see Table 13). A bar graph of preschool student's average daily steps is presented in Figure 16, providing a visual representation of comparison of each student's steps. In addition, the range and variation of student's average steps is visible in Figure 16.

Presented first is a histogram of each student's average steps in 30-minute increments; for example, the average number of steps a student took over the week between 9:01-9:30, and then 10:01-10:30 until 2:30 when the observations ended. The individual student information also is presented with a brief narrative analysis about what activity was observed during that time period for each case.

Preschool Case #1

Student one's average steps observed in the P1 case are presented in Figure 9. During 10:01am- 11:00am, the student took over 600 steps in each 30-minute time period. During this time, the student was observed playing outside at recess during the week. During the 12:31pm-2:00pm time period, the student took less than five steps in each 30 minute-period, which was observed as the student's nap time.

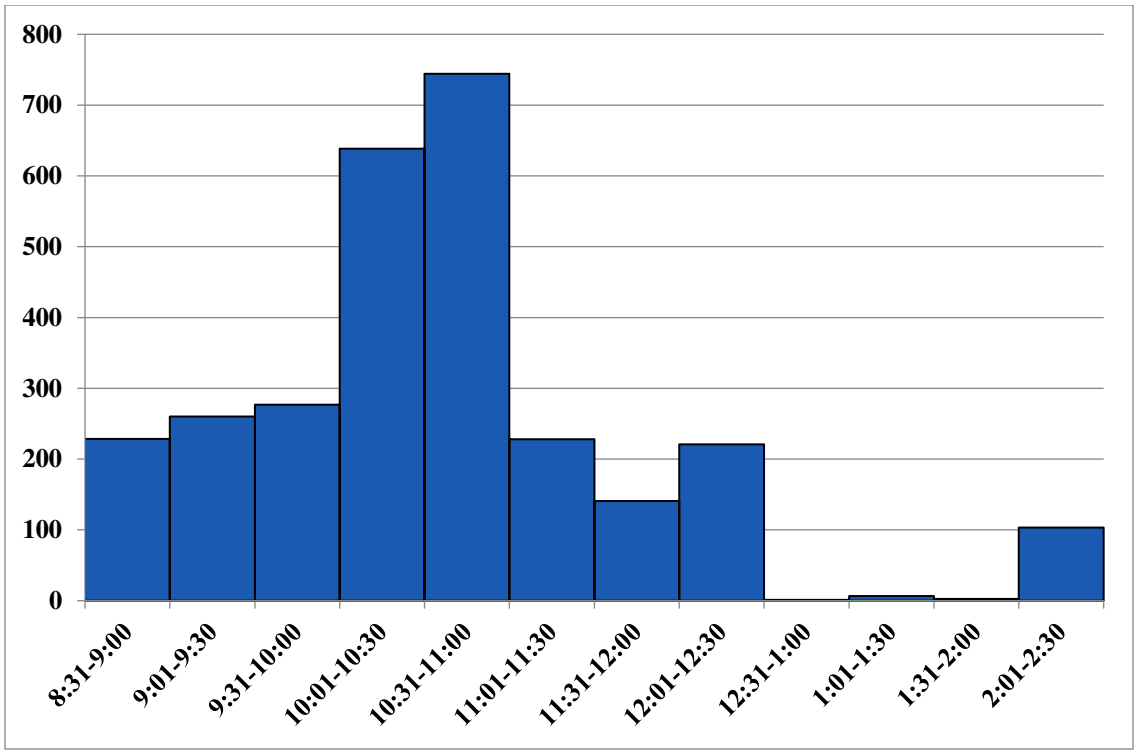


Figure 9. P1S1 average daily steps 30-minute periods.

Preschool Case #2

Five students participated in the study from the P2 case. The typical schedule for the students in the P2 case included an 8:30am arrival time and then breakfast, journal writing around 9:15, 9:30am circle time, 10:00am center rotations, 11:15am transition to the playground for recess, 12:00pm transition inside for bathroom break and then lunch, and then nap began around 12:45pm. Students woke from nap around 1:45pm and would use the restroom and then transition to a table for afternoon snack. In the P2 individual student histograms presented in Figures 10, 11, 12, 13, and 14, the number of steps increased for students during recess and decreased during the time students were resting for nap.

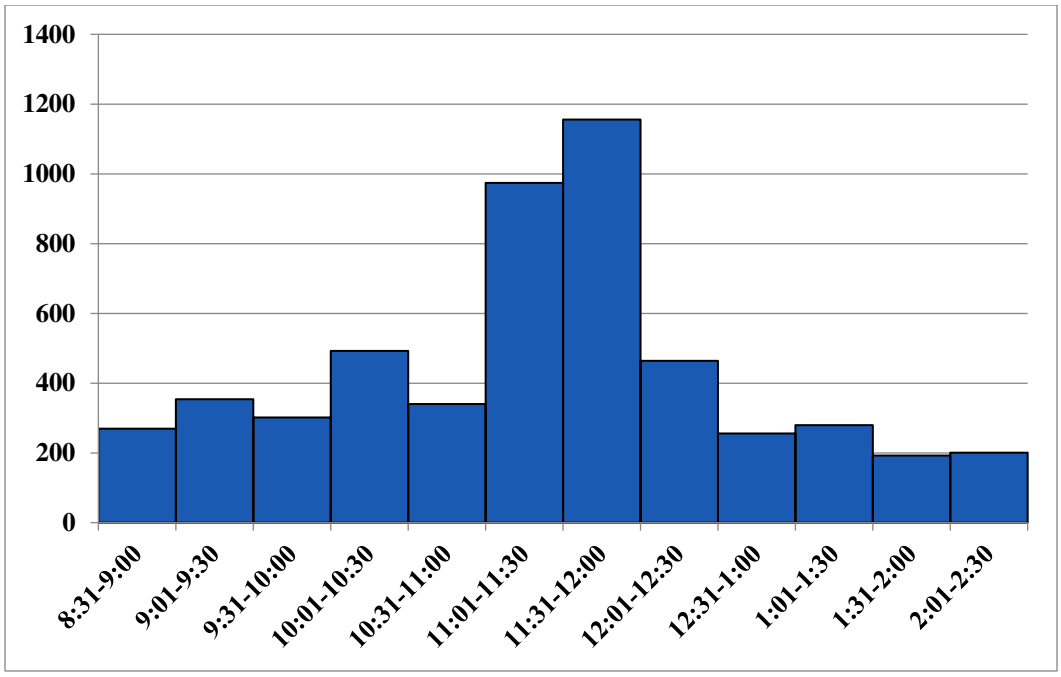


Figure 10. P2S1 average daily steps 30-minute periods.

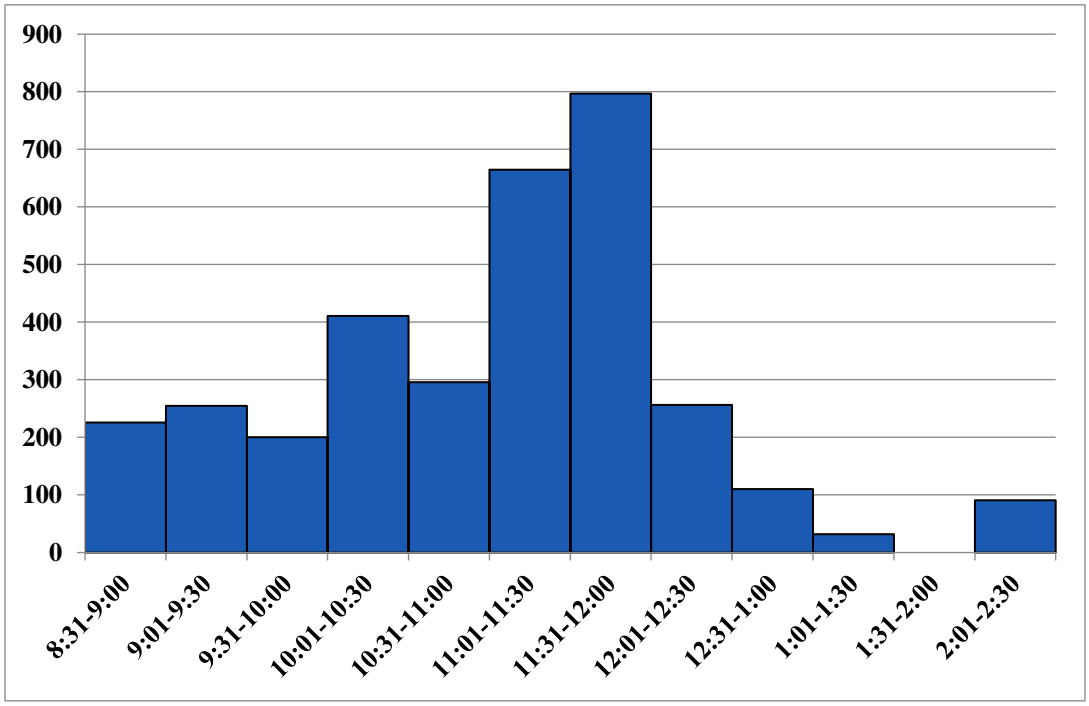


Figure 11. P2S2 average daily steps 30-minute periods.

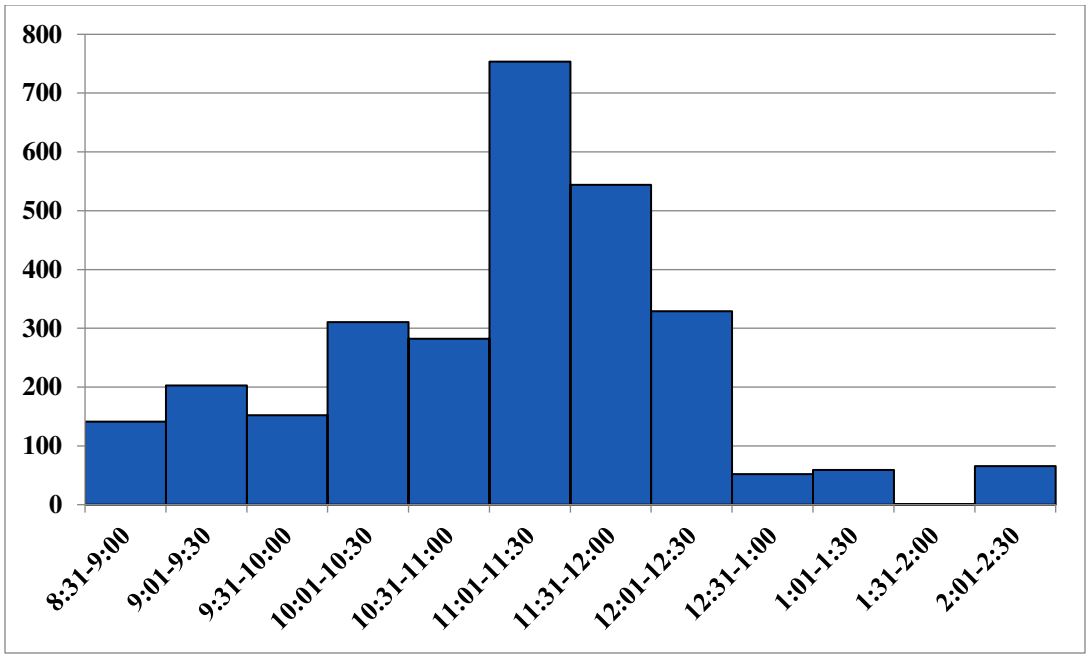


Figure 12. P2S2 average daily steps 30-minute periods

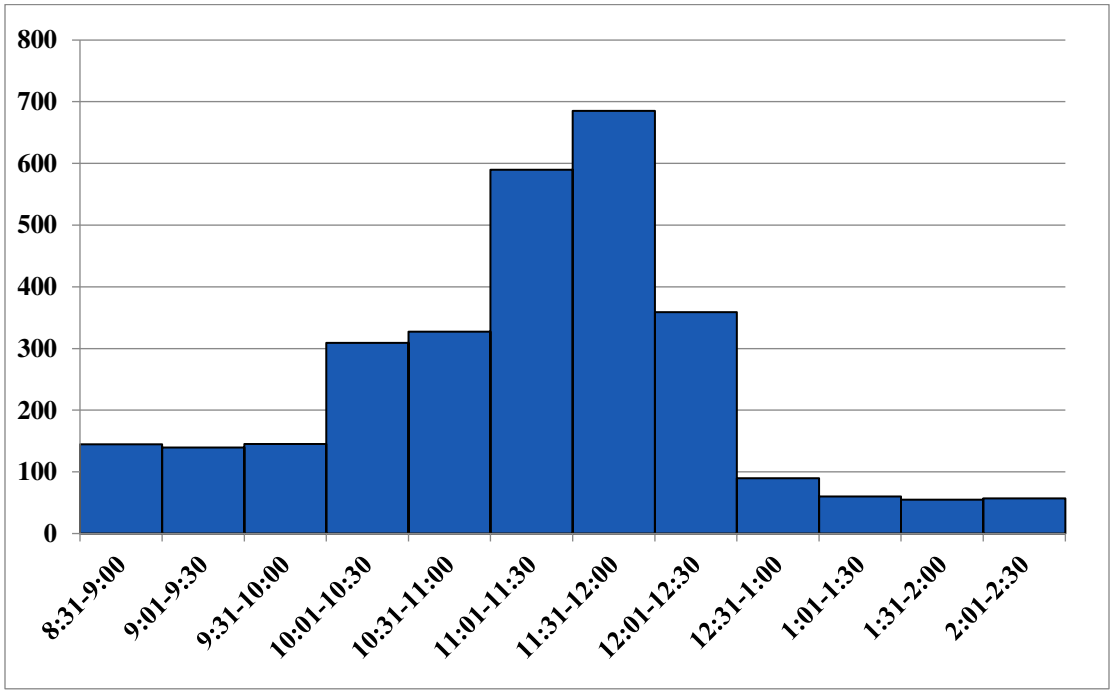


Figure 13. P2S4 average daily steps 30-minute periods.

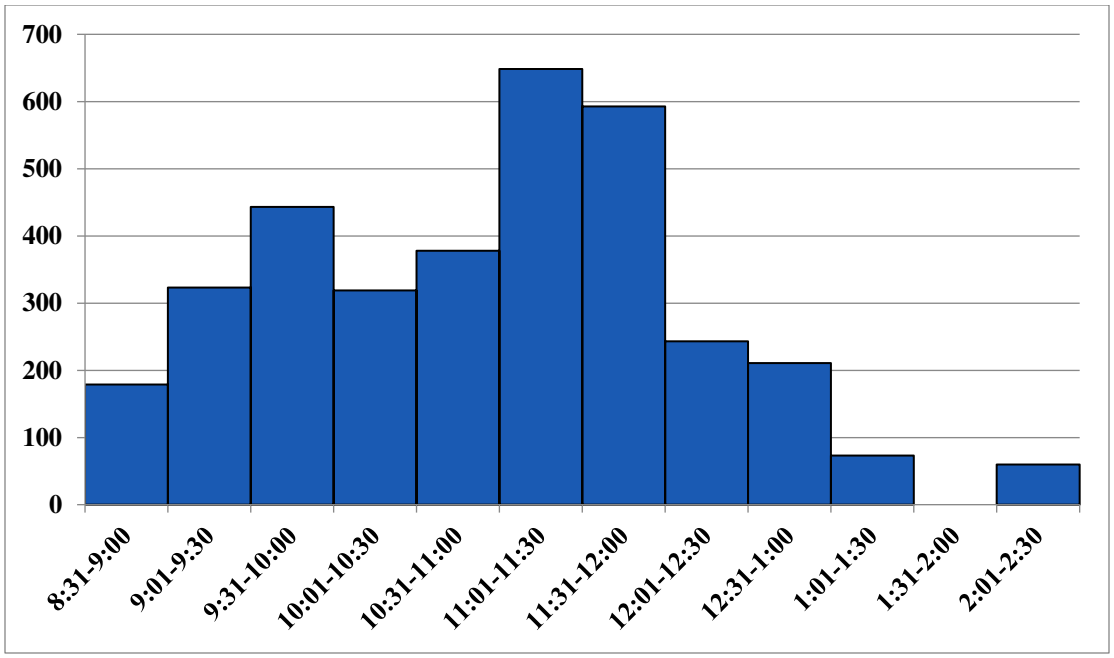


Figure 14. P2S5 average daily steps 30-minute periods

Preschool Case #3

One student from the P3 case participated in the study. The student's average daily steps are presented in 30-minute periods in Figure 15. The student's daily schedule included an 8:30am arrival, breakfast in the cafeteria at 8:45am, 9:15am circle time, around 10:00am was center rotations, 10:30am transition to outside to recess, 11:30am transition back to the classroom for lunch, 12:00pm begin laying down on mat for nap, and around 1:50 students start waking up. After P3S6 woke up, he had an opportunity for free play and technology station. The student's number of steps increased during recess and decreased during nap time.

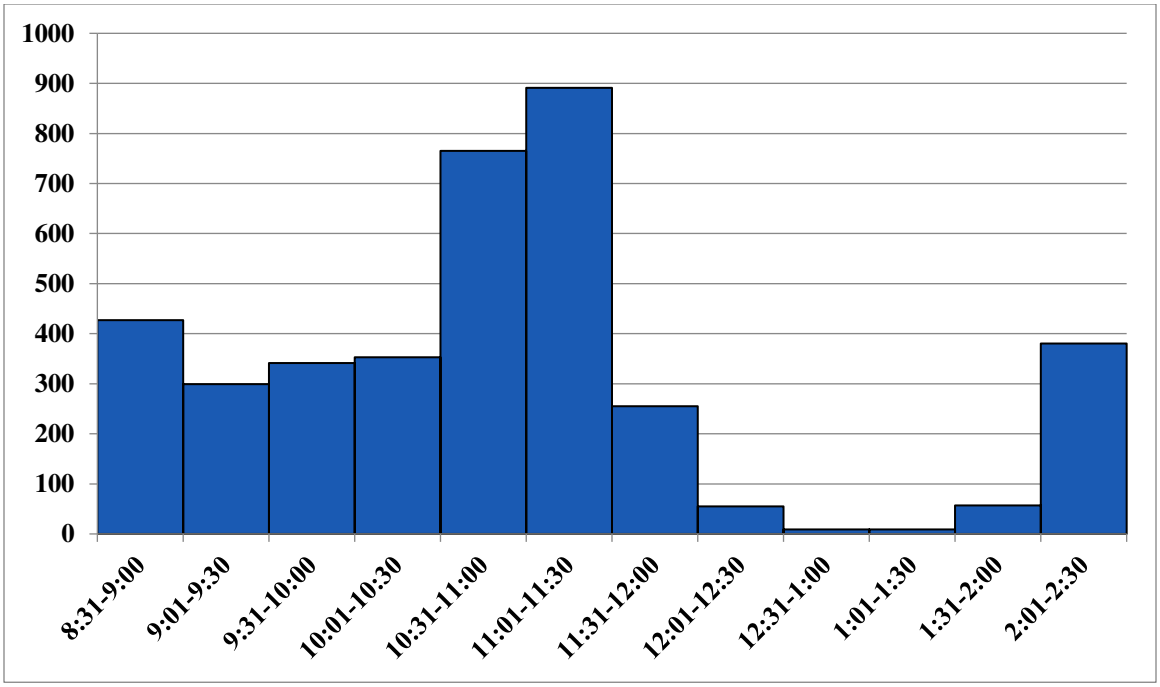


Figure 15. P3S1 average daily steps 30-minute periods.

Table 13

Individual Student Daily Steps & Steps Per Minute

	P1S1	P2S1	P2S2	P2S3	P2S4	P2S5	P3S1	**Average for Preschool**
Average Daily Steps	2851.3	5278.6	3337.5	2891.5	2961.3	3469.3	3842.2	**3518.84**
Average Steps Per Minute	7.92	14.66	9.27	8.031	8.22	9.63	10.67	**9.77**
Average Steps Per Minute Excluding Nap	11.36	14.66*	11.41	9.857	9.95	11.66	14.14	**11.86**

* Student P2S1 did not nap

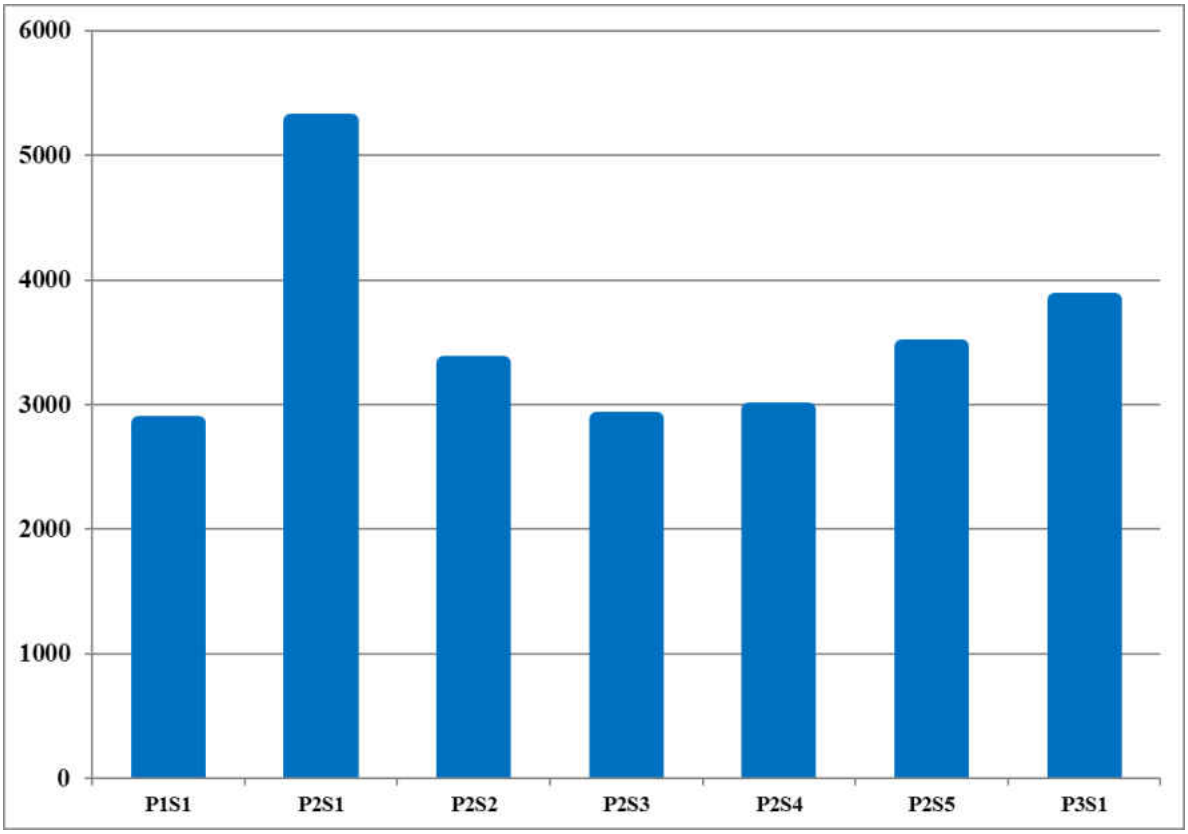


Figure 16. Average daily steps of preschool students.

Description of Kindergarten

The study examined three kindergarten cases with a total of seven student participants. There were three participants from K1, two participants from K2, and two participants from K3. Results are presented below of individual student's average steps in 30-minute increments, average daily steps, an average amount of daily steps, an average amount of steps per minute and average steps per minute excluding the time spent at PE. The time for PE was excluded to normalize the data since PE was a time of constant movement.

Steps

On average, students with DD in Kindergarten took 4609.308 steps per day, and on average, 12.8 steps per minute. An additional analysis of the data was conducted to exclude the amount of time students spent at PE. With the exclusion of PE, students with DD in kindergarten took, on average, 12.18 steps per minute (see Table 14). A bar graph of kindergarten student's average daily steps is presented in Figure 24, providing a visual representation of comparison of each student's steps. In addition, the range and variation of student's average steps is visible in Figure 24.

Presented first is a breakdown of each student's average steps in 30-minute increments; for example, the average number of steps the student took over the week between 9:01-9:30 until 2:30pm when observations ended. The individual student information also is presented with a brief narrative analysis about what activity was observed occurring during that time period.

Kindergarten Case #1

In the K1 case, three students participated in the study by wearing the ActiGraph, and their individual average daily steps are presented in Figures 17, 18, and 19. The weekly scheduled observations in the K1 case included: circle time around 8:30am and students sat at their desks, 9:00am morning center rotation began, after the first center rotation the teacher would typical give the students a break, 11:00am another rotation of centers started, on some days around 12:00pm the students participated in PE, lunch around 12:25pm and story time followed immediately after. At 1:15pm students transitioned outside to recess, and around 2:15pm students came back inside from recess and started a table top activity.

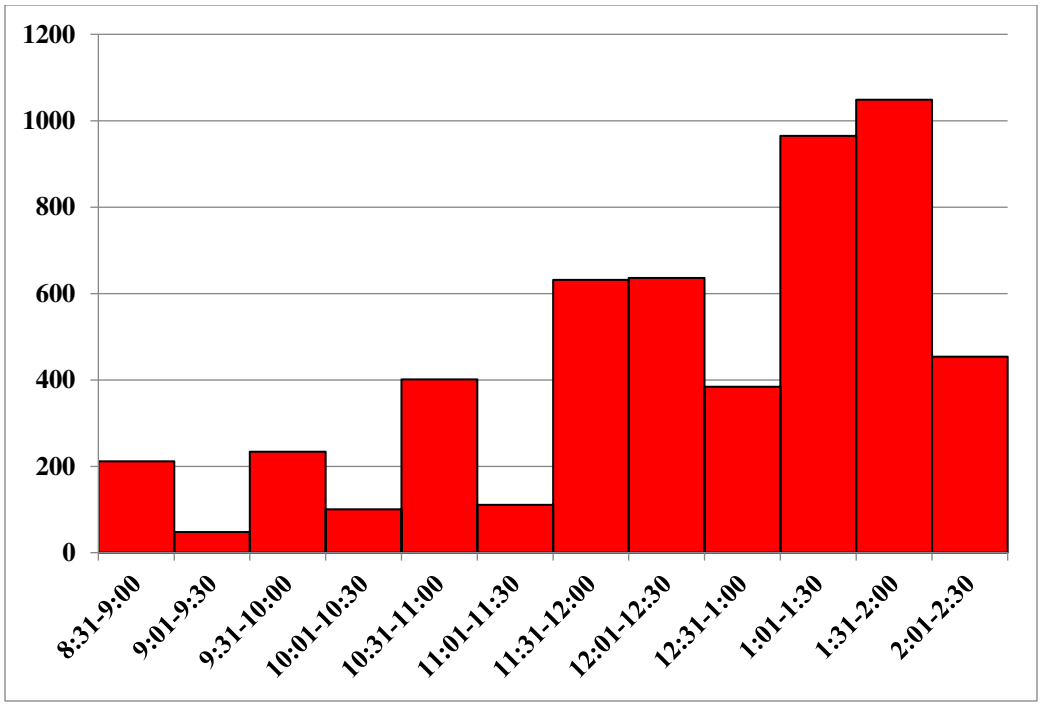


Figure 17. K1S1 average daily steps 30-minute periods.

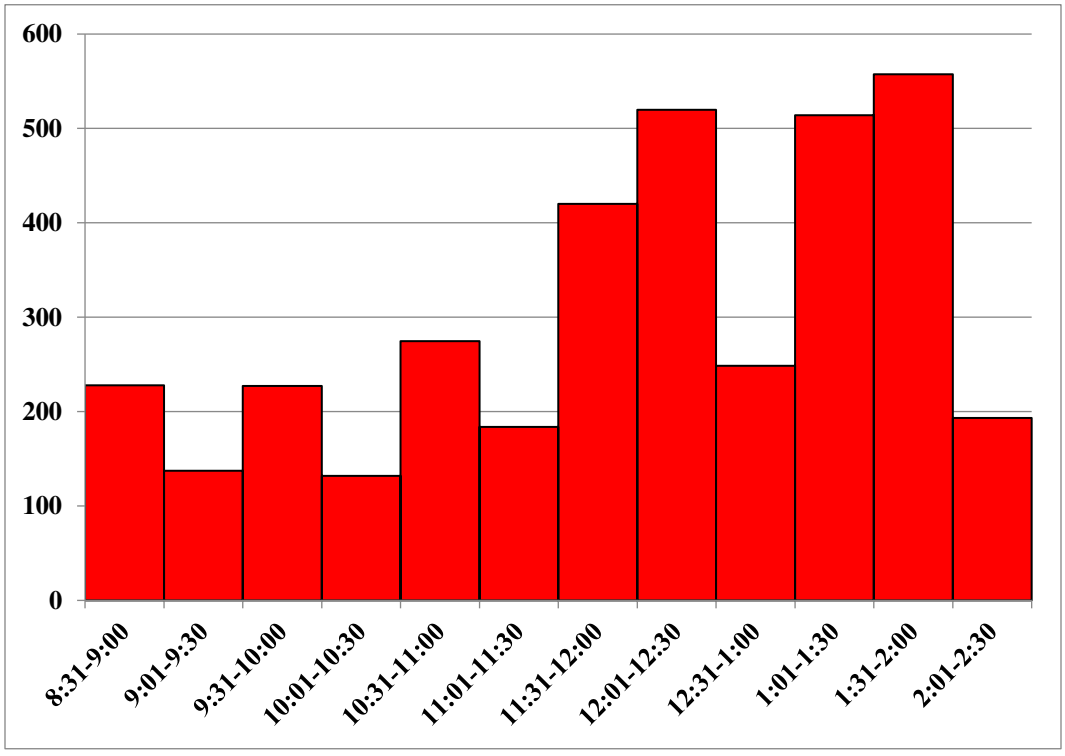


Figure 18. K1S1 average daily steps 30-minute periods.

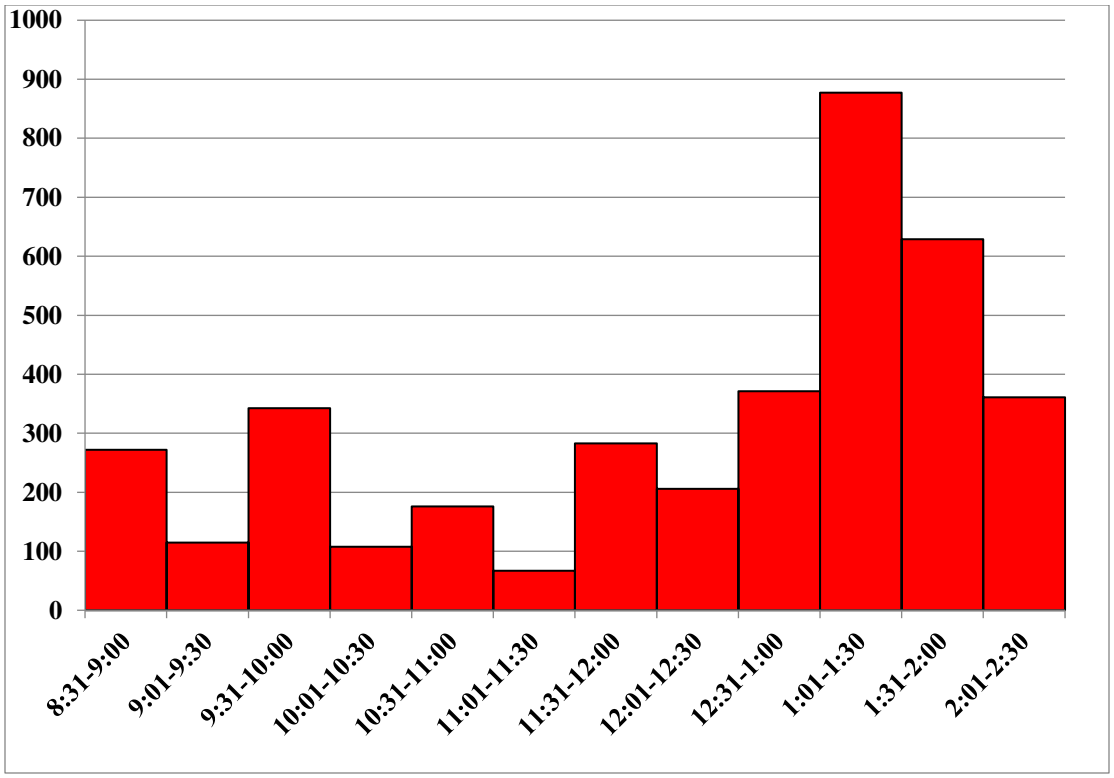


Figure 19. K1S3 average daily steps 30-minute periods.

Kindergarten Case #2

Two students participated in the study from the K2 case. Their individual steps breakdowns are presented in Figures 20 and 21. The typical day observed in the K2 class included students arriving and eating breakfast before 8:30am, school announcements at 8:45am, 9:00am was circle/calendar time and the students sat at their tables, 9:15am was typically a literacy activity, 9:30am center rotations began, 10:30am transition outside for recess, 11:00am students transition inside for recess, 11:10am eat lunch, 12:00pm participated in special areas (i.e., PE and art), 12:45pm whole group math activity, 1:30pm until the end of observations students participated in math center rotations.

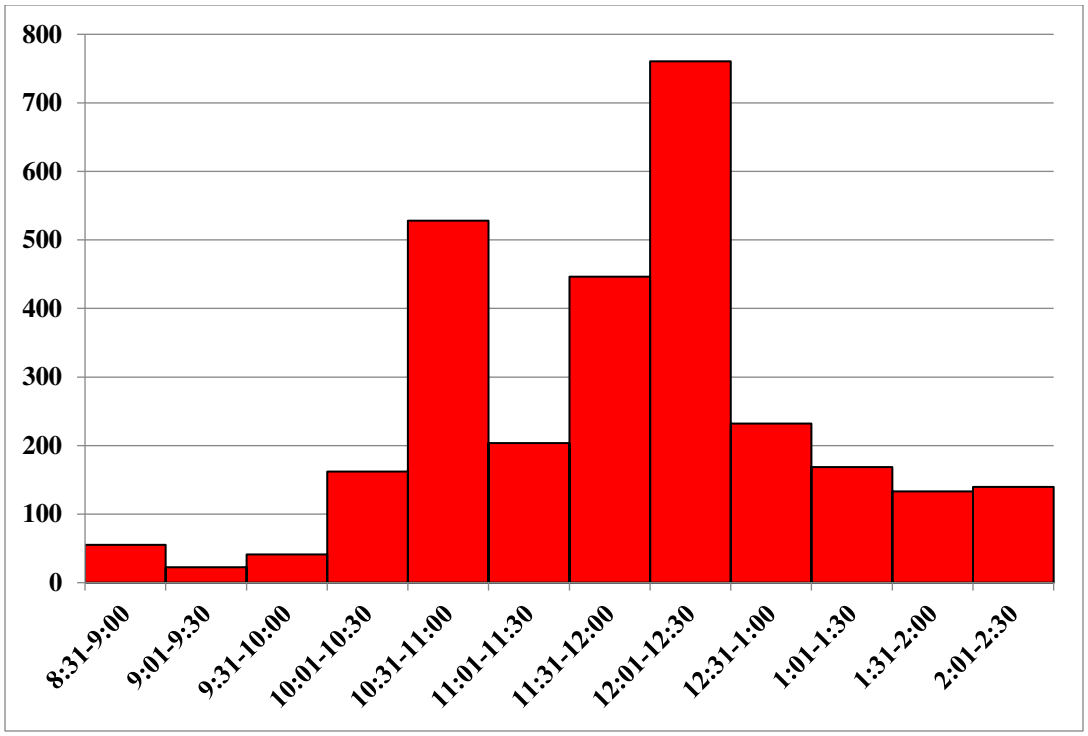


Figure 20. K2S1 average daily steps 30-minute periods.

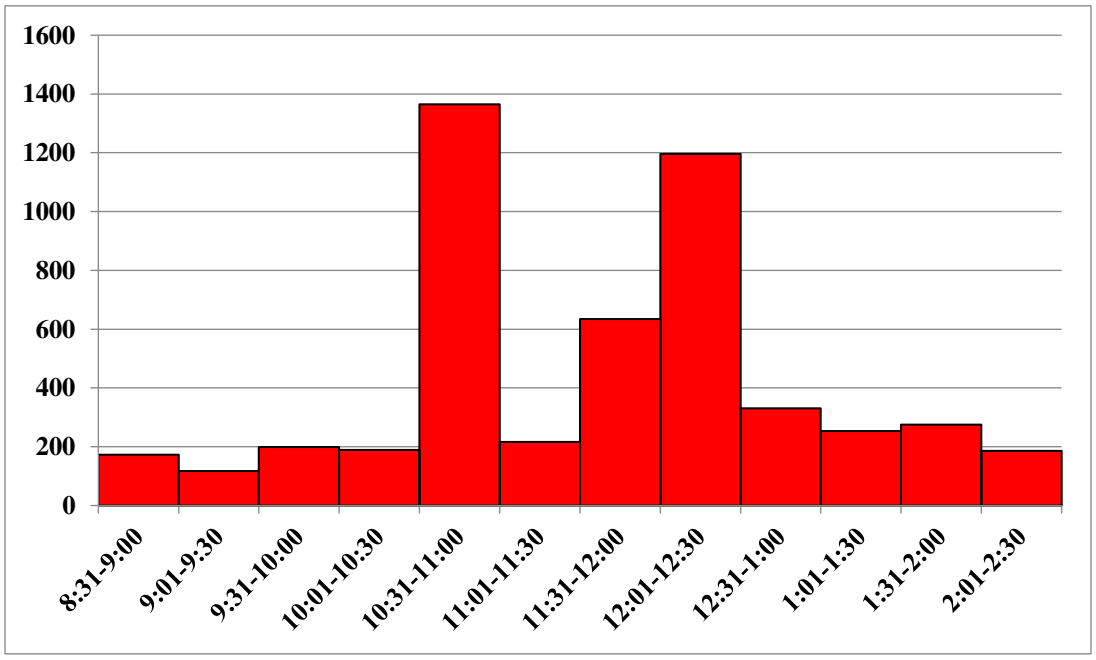


Figure 21. K2S2 average daily steps 30-minute periods.

Kindergarten Case #3

In the K3 case, two students participated in the study and their individual steps taken is presented in Figures 22 and 23. The typical schedule observed in the K3 class began with breakfast at 8:30am, a quick brain break at 8:50am, social studies activity around 9:00am, 9:45am group rotations began, 10:40am students transition outside to recess, 11:10am students transition back inside the classroom and wash hands, lunch starts around 11:20am, 12:00pm students are finished eating lunch, math begins around 12:25pm and includes a whole group instruction and center rotations, science is around 1:40pm, and then special area (i.e., music and PE) around 2:00pm.

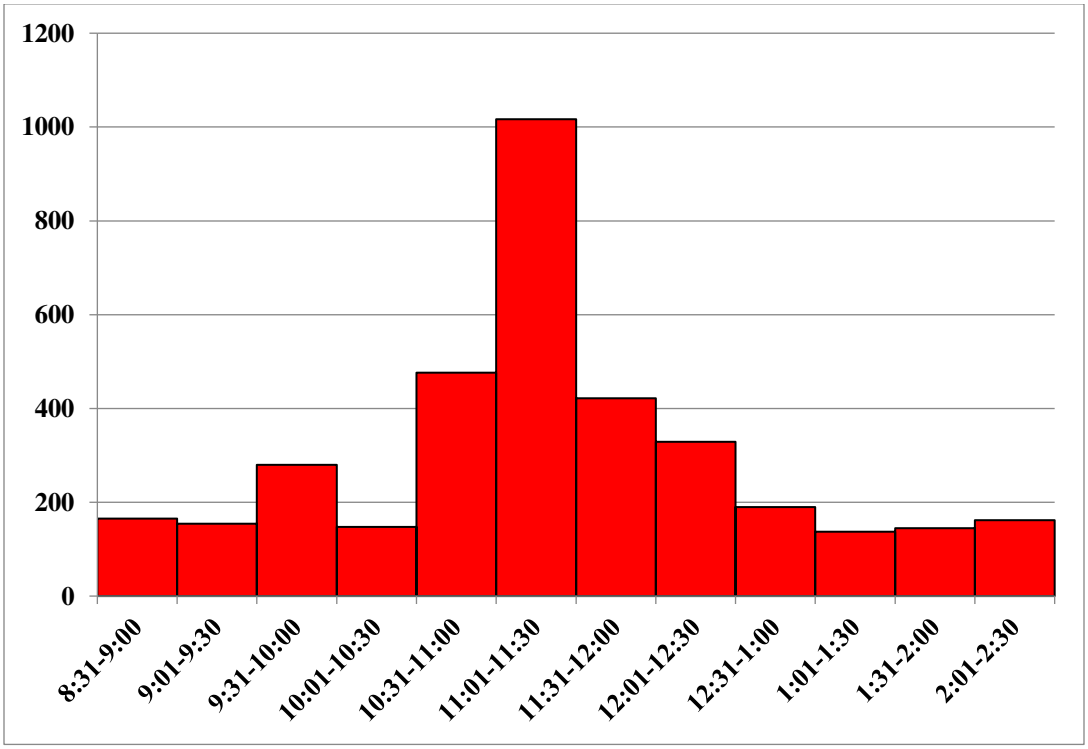


Figure 22. K3S1 average daily steps 30-minute periods.

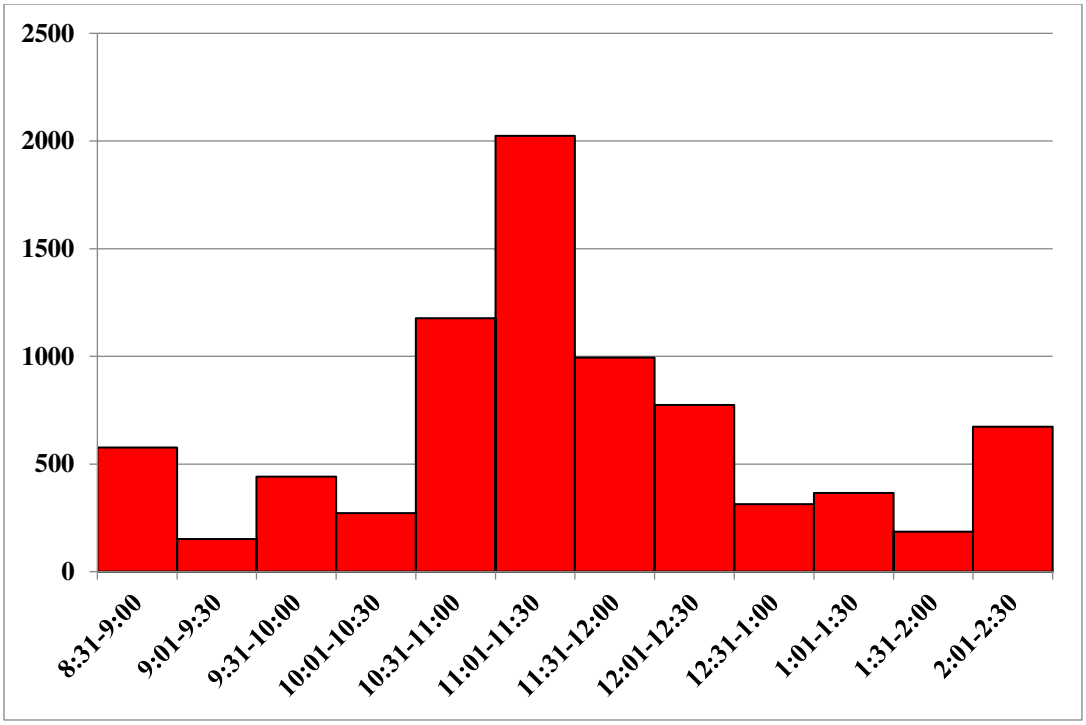


Figure 23. K3S1 average daily steps 30-minute periods.

Table 14

Individual Kindergarten Student Daily Steps & Steps Per Minute

	K1S1	K1S2	K1S3	K2S1	K2S2	K3S1	K3S2	**Average For Kindergarten**
Average Daily Steps	5224.33	3636	3807.5	2893	5135.33	3623.5	7945.5	**4609.308**
Average Steps Per Minute	14.512	10.1	10.576	8.036	14.26	10.065	22.07	**12.8**
Average Steps Per Minute W/O PE	13.648	9.38	10.576	8.419	11.12	10.065	22.07	**12.18**

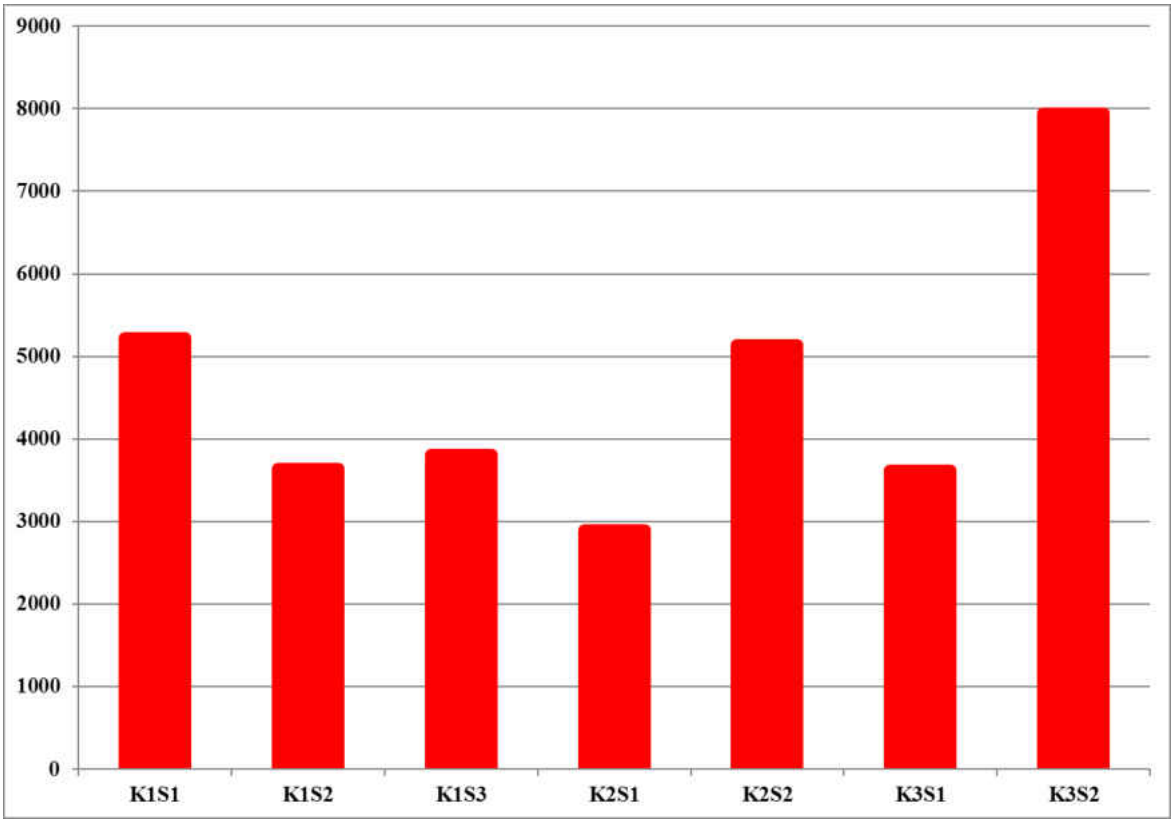


Figure 24. Average daily steps of kindergarten students.

Comparison of Preschool and Kindergarten Cases

Both preschool (*n*=7) and kindergarten (*n*=7) students with DD were observed in three different preschool cases and three different kindergarten cases to measure their physical activity level by how many steps were taken. When comparing an average daily amount for steps taken by students in kindergarten, their level of movement was higher than compared to preschool students (see Figure 25). While kindergarten students had a greater number of daily steps taken, additional variables attributed to these differences. Those additional variables included that preschool students napped for approximately 90 minutes, but kindergarten students were engaged in activities during that time. In contrast, in kindergarten, students had the opportunities

to engage in different special areas that allowed for engagement in accelerated movement, such as PE.

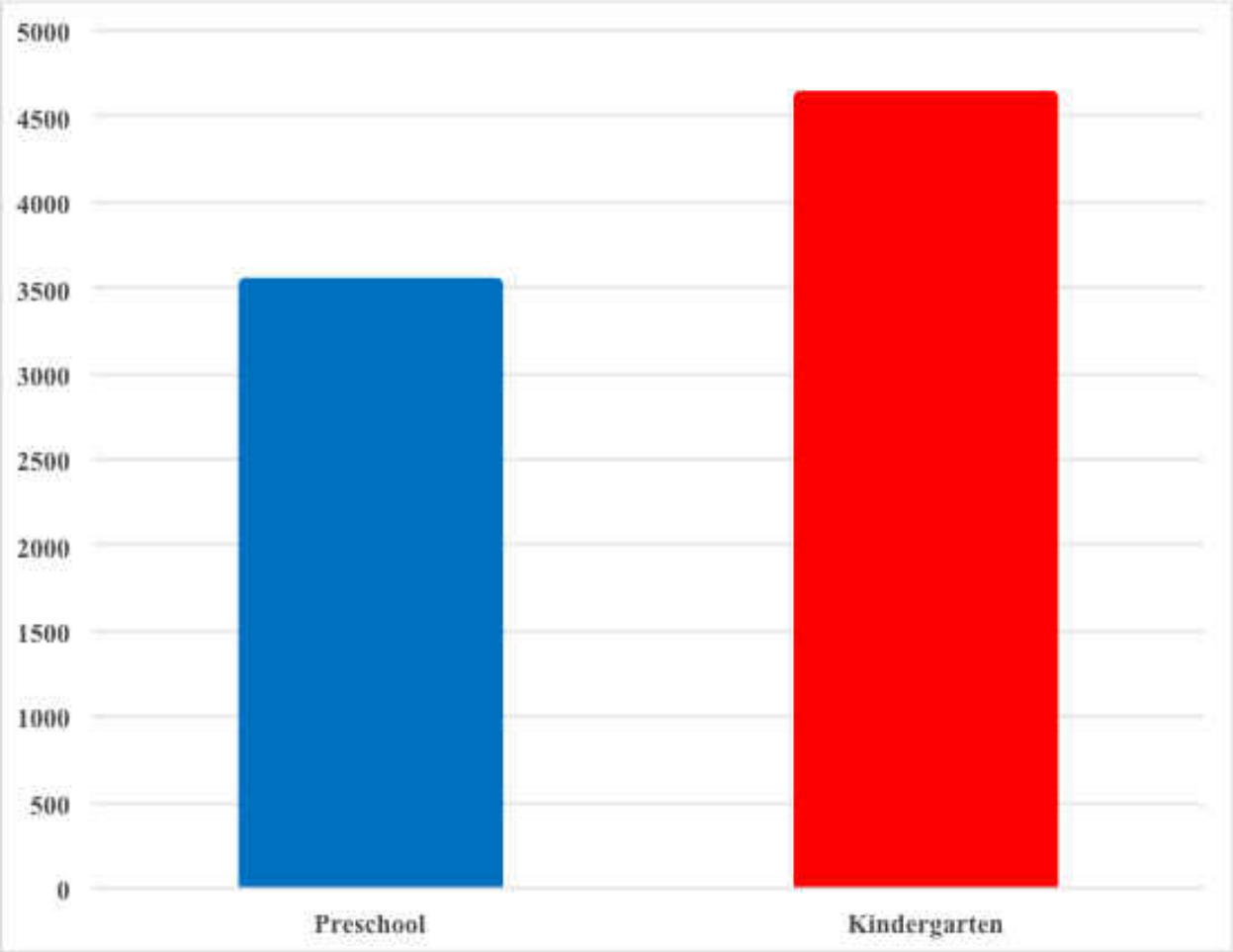


Figure 25. Comparison of average daily steps

In order to normalize the physical activity measurement of steps taken for preschool and kindergarten students, an additional analysis was completed. A measure of the average steps taken per minute for preschool, excluding specific naptime for each of the preschool cases, was compared to an average steps taken per minute for kindergarten cases, excluding the time recess occurred (see Figure 26). While kindergarten students still took more steps per minute without

PE, 12.18, the difference between preschool steps per minute without nap, 11.6, was comparable after removing these variances in movement across the two environments.

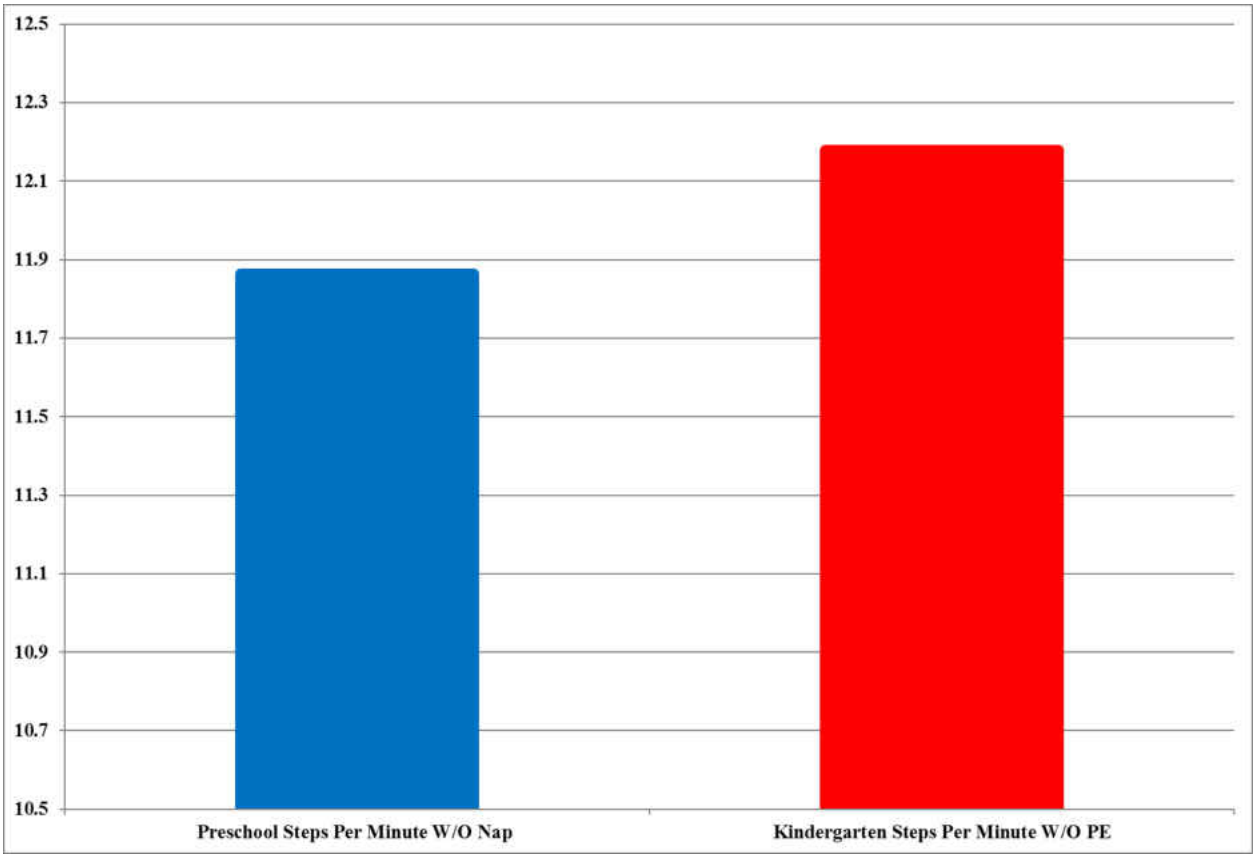


Figure 26. Comparison of an average of steps per minute, excluding naptime in preschool and PE time in kindergarten.

Movement Comparison of Preschool and Kindergarten

To answer this question, triangulation of data occurred using teachers' perceptions (Q1), themes derived from lesson plans, classroom schedules, observations, interviews (Q2 and 3), and ActiGraph data (Q4 quantitative analysis). "What are the differences in preschool and kindergarten classrooms for young children with disabilities, related to: (a) Movement in daily classroom activities?, and (b) Movement integrated into teacher-directed mathematics activities?"

The differences in movement between kindergarten and preschool cases emerged with findings of both similarities and differences. Areas of similarity included two shared themes which emerged across the settings, while three themes identified were unique to preschool and one unique theme, aligned with kindergarten cases (see Figure 27).

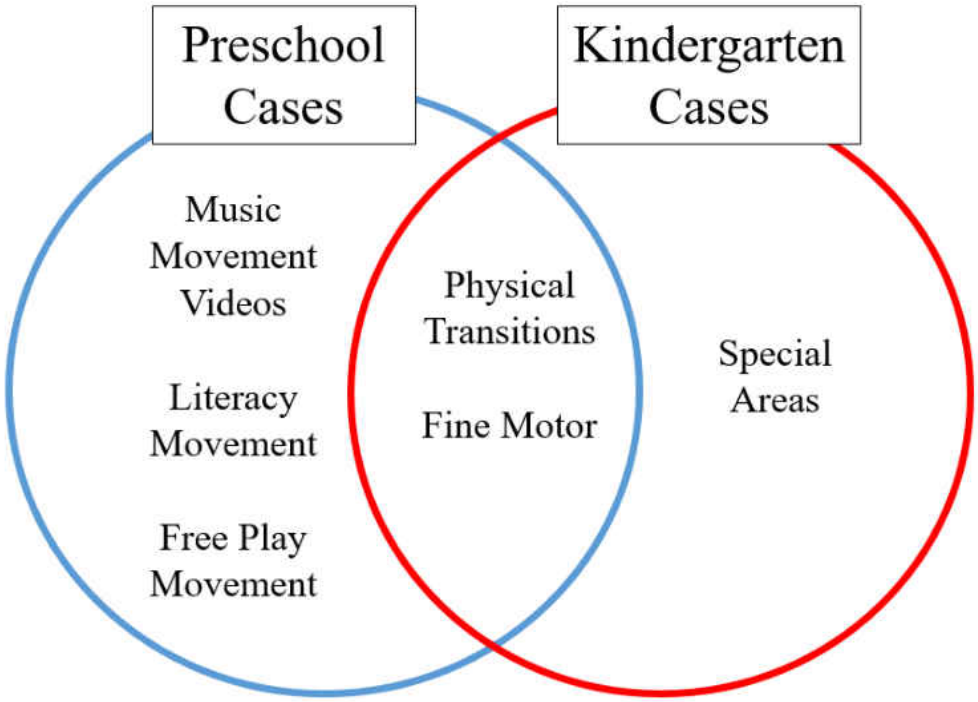


Figure 27. Comparison of preschool and kindergarten movement themes.

Two clear differences among preschool cases and kindergarten cases were teachers' perceptions of the importance of physical transitions and the extent that transitions occur in the classroom. When interviewing preschool teachers, they discussed how they purposefully have students transition from completing an activity sitting on a classroom rug to transitioning to an activity at the table. When interviewing kindergarten teachers, this perception of transitions as opportunities for movement did not emerge. On average, all preschool cases (P1, P2 and P3)

were observed transitioning 12 times a day while all kindergarten cases (K1, K2 and K3) were observed transitioning, on average, 10 times day. While this difference does not appear to be significant in the number of transitions between the preschool and kindergarten classes, all preschool cases participated in naptime that was an hour-and-a-half long.

Both the preschool and kindergarten cases were observed providing opportunities for students to engage in fine motor movements during instruction. The types of fine motor movements were different between the preschool and the kindergarten cases. The fine motor movements observed in the kindergarten cases (K1-K3), more often than not, included students using paper and pencils to complete a workbook activity or a worksheet, while in the preschool cases (P1-P3), the fine motor activities did not involve pencil and paper activities as often. For example, in the P2 case, the students were observed playing and identifying letters by using fly swatters. In the P1 case, students were observed creating a spider web with glue and putting yarn across the glue, while learning about spiders. Two of the preschool cases (P2 and P3) had students participate in a journaling activity once a day that included the use of paper and pencils. The kindergarten cases were observed participating in fine motor table work that included the use of paper and pencil activities two to eleven times a day.

Three themes emerged from triangulation of data sources unique to preschools and movement, which were (1) the use of videos with music and movement, (2) literacy movement, and (3) free play movement. The integration of movement into literacy activities was observed across all three preschool cases (P1, P2 and P3) and typically required students to respond to an answer through conducting a movement. For example, in the P1 case, the teacher was observed every morning reviewing “zoo phonics” cards in which the students would make arm movements representing different animals to identify letters and letter sounds. In addition, in the P2 case,

students were observed identifying letters when asked by the teacher by smacking it with a flyswatter. In the P3 case, the teacher was observed engaging the students in a read aloud by directing them to make movements to correspond with what she was reading (i.e., when reading about a super hero, she had students hold their arms out and fly like a super hero). The use of movement during literacy activities was only observed in the K2 and K3 cases as students walking to the SmartBoard to point to words in an interactive book. Literacy and movement was not observed across all kindergarten cases and could not be identified as a theme.

Free play opportunities occurred in all preschool cases (P1-P3) and were noted in observations happening between one to four times daily. Free play allowed students to engage in both fine and gross motor activities with little restrictions. The free play opportunities were integrated in all preschool cases as a center station during rotations, while one of the other centers during the rotation included a teacher-directed activity. Free play opportunities were not observed in any of the kindergarten cases.

The one, non-overlapping theme for kindergarten cases was special areas. All kindergarten cases participated in special areas during the week of observations. The K1 case attended PE twice, the K2 case attended PE twice and participated in art once, and the K3 case attended PE once and participated in music twice. The preschool cases (P1-P3) did not participate in any special area classes because it is not part of their school curriculum.

In contrast to some unifying themes, teachers' perceptions were contrasting across cases in their viewpoint about movement. Kindergarten teachers did not place great value on the need for movement at this level. Yet the ActiGraph data showed the highest rate of movement occurred in kindergarten. When normalized for and removing PE, which only occurred in

kindergarten, and removing naptime at the preschool level, which allowed for no movement, the two environments were more alike than different in the amounts of steps per minute.

Movement and Mathematics Comparison of Preschool and Kindergarten

To answer this question, triangulation of data sources occurred across teachers' perceptions (Q1), themes derived from lesson plans, classroom schedules, observations and interviews (Q2 and 3), and data from the ActiGraph accelerometer (Q4 quantitative analysis). The ability to look at the ActiGraph data during individual mathematics time was not an option due to the integration of numeracy at the preschool level across the day instead of at a specific time; hence the triangulation of data are presented as a beginning discussion for the field about movement in general in mathematics.

The differences in the integration of movement in mathematics between kindergarten and preschool classrooms emerged with similarities and differences. Only one theme emerged from the preschool cases related to movement in mathematics: fine motor manipulatives. In comparison, only one theme emerged from the kindergarten cases, which was fine motor workbooks. Preschool teachers provided their students with multiple types of manipulatives when engaged in mathematics learning compared to kindergarten teachers who instructed students through mathematics with the use of workbooks. While total, physical response mathematics activities were observed in kindergarten cases three times, these teachers did not consistently implement other strategies outside of workbooks related to any type of movement. From the data sources gathered in this study, movement in mathematics did not occur beyond fine motor skills in either setting. While the degree of fine motors skills varied between preschool and kindergarten settings, neither setting reflected gross motor movement consistently.

Reliability

A peer debriefer conducted reliability of categories and filtered themes. The peer debreifer was provided with (a) directions in Appendix L; (b) an excel file of important phrases, categories, and themes; and (c) original data sources. The peer debriefer was asked to provide agreement or disagreement of categorized and final themes. The peer debriefer identified disagreements with categories assigned to important phrases, but did not disagree with any of the identified themes. The disagreements were reconciled until an agreement was made between the researcher and the peer debriefer.

To identify reliability of the ActiGraph data, the peer debriefer first reviewed the raw data downloaded from the ActiGraph device. The review consisted of identifying if the data was correctly input into a separate excel file to conduct the analysis for the study. Further reliability check of the ActiGraph data consisted of the peer debriefer preforming a second analysis of measurements presented in order to identify errors. The rate of accuracy in analysis and reporting of these data were calculated to be 100%.

Conclusion

Findings from this mixed method study about differences in preschool and kindergarten settings and teachers' perceptions emerged, showing some differences in use of movement as an instructional strategy in both instruction and in a targeted area of mathematics. Preschool teachers' perceptions of teaching strategies noted the importance of integrating mathematics throughout the school day and movement having the potential to increase students' engagement. Kindergarten teachers expressed modeling is an effective strategy for teaching children with DD. Preschool teachers integrated movement through music videos, literacy activities, free play,

physical transitions, and a variety of fine motor activities. Kindergarten teachers, in comparison, implemented movement through physical transitions, fine motor activities, and through participation in special areas. In regards to the integration of movement in teacher-directed mathematics activities, preschool teachers implemented a variety of manipulatives that required fine motor use compared to kindergarten teachers who implemented fine motor movement using workbooks. Overall, both similarities and differences were observed related to movement, perceptions', and the relationship of movement in mathematics across and between cases. The results derived in relation to the literature and these findings are discussed in chapter five.

CHAPTER 5: DISCUSSION

Introduction

In this chapter, (a) research questions, (b) purpose of the study, (c) statement of the problem, and (d) review of the multiple case study methodology are provided. A discussion of the findings of the study are presented with connections to current literature, research questions, and the researcher's reflections. The chapter concludes with a discussion of recommendations for future research based on findings, along with implications and limitations of the current study.

Purpose

The researcher's purpose in conducting this study was to examine and describe the differences in movement and movement-based mathematics activities in preschool and kindergarten classroom settings. The investigation of movement was examined through the lens of how it pertains to children with disabilities and the alignment of teachers' perceptions in relation to different instructional strategies between the preschool and kindergarten environments. Teachers' perceptions of strategies provided insight into if, and why, teachers use movement in their classrooms. Comparisons between the two observed settings, preschool and kindergarten, were recorded and interpreted through qualitative data and through a quantitative analysis of information using the ActiGraph accelerometer to ascertain how movement was occurring for young children with disabilities in the two settings. The purpose of observing movement within preschool and kindergarten settings was to identify how different environments promoted the development of skills and potential transitions between educational settings. In addition, the purpose of this research study was to dive further into how movement is integrated into specific instructional domains; in this instance, mathematics.

Statement of Problem

Many young children with DD, transitioning from preschool to kindergarten, find themselves in a critical stage in their educational programing (Fowler et al., 1991; Fowler, 1982; Welchons & McIntyre, 2015), while sometimes encountering acute and unique challenges. The challenges of transitioning from preschool to kindergarten are acknowledged, but the relationship of the changes in physical movement between the two settings may be impacting the development of children.

Research Questions

The following research questions framed the methods of analysis used in this research investigation. Question one consisted of interviews and a survey of teachers. Questions two and three were answered using classroom observations, lesson plans, class schedules, interviews, and quantitative data from students with disabilities on the number of steps they took daily in a classroom over the period of a week of observations. Question four was answered through triangulation of the data gathered, aligned with questions one to three.

1. How do Head Start preschool teachers and Title One kindergarten teachers perceive the importance of
    a. Different teaching strategies for students with DD?
    b. Integrating movement into activities as a teaching strategy for students with DD?
2. How are practices integrated into preschool classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

3. How are practices integrated into kindergarten classrooms for young children with disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?
4. What are the differences in preschool and kindergarten classrooms for young children with developmental disabilities, related to
    a. Movement in daily classroom activities?
    b. Movement integrated into teacher-directed mathematics activities?

Review of Methodology

This study followed a mixed method research design that included the examination of multiple preschool and kindergarten cases, with an embedded measurement of quantitative data. After interviews with the teachers, a week of observations in their classrooms, collections of the surveys, classroom schedules, and lesson plans; the researcher was able to create a detailed description of the differences and similarities of movement in preschool and kindergarten classrooms for students with DD.

The perceptions of preschool teachers included that movement has the opportunity to increase engagement, while kindergarten teachers did not express that they saw movement as important; however, for kindergarten teachers, teacher modeling was a way to instruct young children. While the quantitative data showed that kindergarten students engaged in more physical activity based on steps taken than preschool students, the variety of movement in preschool surpassed how kindergarten teachers were integrating movement. Preschool teachers allowed their students multiple opportunities to get up and transition, engage in creative fine motor

activities and participate in movement videos that gave students a break from academic content. Conversely, students in kindergarten settings were limited to engaging in movement when they were involved in special areas, such as PE and music, or completing paper and pencil fine motor activities.

Theoretical Framework

The theoretical framework this study was situated in includes three different theories. Situated learning (Brown, Collins, & Duguid, 1989), cognitive development (Piaget & Inhelder, 1969), and child-centered theory (Dewey, 1959) provided a development base framework for data analysis.

Situated learning is a theory developed by Dewey (1959) about creating child-centered environments to promote cognitive development through active engagement. The findings from this study support this theoretical lens. All preschool teachers provided evidence they integrated movement throughout their classroom because they perceive it encouraged engagement. While kindergarten teachers did not express the same sentiment about movement, it was observed when students in kindergarten were given an activity that required them to be hands-on or use objects when trying to complete the activity.

Another theory was used as part of the framework to understand how instruction in early childhood should follow a cognitive development sequence. The cognitive development theory is about four stages of learning: (1) sensorimotor, (2) preoperational, (3) concrete operational, and (4) formal operational. In order for young children to move into the preoperational stage of using their explorations to develop memories and connections, they must have a rich sensorimotor stage, in which children explore their environments through physical interactions. This theory

supports what was being observed across preschool and kindergarten cases. Preschool cases allowed students more opportunities for physical explorations, including academic activities, while kindergarten teachers expected students to be able to start making connections to higher order thinking.

Situated learning is a theory that provides a foundation that children learn best when they have opportunities to actively participate within a lesson (Brown et al., 1989). In this study, when teachers encouraged active participation through lessons that included movement compared to a scripted "lecture," students appeared to be more excited and interested in the activity.

Discussion of Connections between Literature and Findings

In the following section, the researcher reviews the themes of each research question, the connections to previously mentioned literature, connections to current literature, as well as the researcher's reflections connected to each research question. The contextualization of movement and the transition between preschool and kindergarten are areas in need of further considerations in the field.

Historical Early Childhood

Historically, the development of kindergarten was to prepare young children for learning at an earlier age, similar to preparing the child to be ready for formal schooling (Manning, 2005). Early intervention was created to provide young children, who were at risks for disabilities, the opportunity to engage in learning to try and level the playing field with their same age peers. Through observations of preschool and kindergarten cases in this study, it appeared as though

early intervention services in preschool in the cases observed were trying to prepare young children for kindergarten. It also seems as though, in the cases observed, kindergarten is less about developmentally appropriate practices, but has become similar to formal schooling and is focusing on preparing young children for an assessment driven education.

DEC Recommended Practices and NAEYC Developmentally Appropriate Practices

The NAEYC published a set of twelve principles of child development and learning that are used to guide the education of young children. Some of the principles include, "children are active learners…play is an important component to promote social, emotional and cognitive development…children demonstrate what they know and learn in different modalities" (Copple & Bredekamp. 2009. P.9-15). The DEC also has published a set of recommended practices developed through a combination of NAEYC's Developmentally Appropriate Practices and empirical research in the field of early intervention (Carta et al., 1991). The recommended practices are organized into eight categories with the category of environment suggesting that practitioners

> Consider Universal Design for Learning Principles [UDL] to create accessible environments [and]… create environments that provide opportunities for movement and regular activity to maintain or improve fitness, wellness, and development across domains. (Division for Early Childhood 2014, p. 9)

While in the category of instruction, it is suggested practitioners use "embedded instruction within and across routines, activities, and environments to provide contextual relevant learning opportunities [and] use systematic instructional strategies with fidelity to teach skills and to promote child engagement and learning" (Division for Early Childhood, 2014, p. 12).

The findings of this study support the principles of the NAEYC and the recommended practices by the DEC. The findings of the preschools aligned more closely with the recommendations and principles than the findings of the kindergarten cases. All preschool teachers (P1, P2 and P3) were observed allowing their students opportunities to engage in free play anywhere from one to four times a day. Two teachers (P1 and P2) expressed, during the observations, that it is important to have lots of opportunity for play because their early childhood coordinator expects it. Preschool teachers provided their students with a variety of opportunities for movement as a way to enhance instruction and as a way to take a break from instruction. For example, movement and music videos, fine motor activities, and opportunities to transition throughout the classrooms were observed in the preschool cases. Kindergarten teachers (K1, K2 and K3) did not implement any opportunities for free play in their classrooms. And while they did implement movement, it was very limited in the degree and variety.

Recommendations are that, even though kindergarten cases have instances that align with the practices and principles, teachers have moved away from integrating opportunities for play and movement, and need to find opportunities to create an environment to allow young children to be active learners. The DEC recommended practices were developed for children, ages birth to eight-years-old, and the NAEYC principles were developed for children through kindergarten, providing further evidence of the importance that teachers implement these practices in their classrooms.

Transition from Preschool to Kindergarten

"Transition refers to the events, activities and processes associated with key changes between environments or programs during the early childhood years and the practices that

support the adjustment of the child and family to the new setting" (Division for Early Childhood, 2014, p.15). Transitioning from preschool to kindergarten settings is an extremely important time that has the potential to impact the future education of young children with disabilities (Fowler, 1982, Fowler et al., 1991; Welchons & McIntyre, 2015). At times, young children with disabilities encounter difficulties with transitioning to new educational settings, noted by kindergarten teachers. Difficulties in the transition to kindergarten are frequently related to social, behavioral and functional skills (Odluyurt & Batu, 2009; Rimm-Kaufman et al., 2000).

Findings from this study provided evidence that when preschool teachers were planning their lessons, they were implementing strategies in order to prepare their students for the demands of kindergarten. The findings show preschool teachers perceive and understand planning for transitioning from preschool to kindergarten is an important part of preparation in preschool settings for children with disabilities. The P2 preschool teacher made a comment that she engages her students in a journaling activity, requiring them to sit at a table and complete a pen and paper activity because she is trying to prepare them for kindergarten. In the P3 case, the teacher had the students complete a pen and paper journaling activity every morning when they first arrived. On the other hand, kindergarten teachers did not express any thoughts about how they were working to bridge the transition gap between settings. This finding suggests kindergarten teachers may not find the transition between settings as important, or potentially, that they are responsible for assisting with this transition to their setting since they are the receiver of students with disabilities. A consideration would be to provide more synergy between preschools that align with intake kindergarten classrooms for students with disabilities, related to movement and overall transitions as an area in need of further exploration. In addition, difference in movement opportunities observed across preschool and kindergarten cases show

the possible difficulties for students, specifically students with DD, like student two in the K3 case who had an average of 7,945.5 daily steps compared to an average 4,609.30 daily steps of his peers. This student is an example of how movement can impact educational experiences; for this particular student, he naturally has the desire to move around, but if restricted, difficulties and frustrations could arise which has the potential to impact his academic development.

Recommendations are that both preschool and kindergarten teachers work together to find a way to scaffold what is learned and what occurs in preschool to kindergarten settings. Policy makers and individuals who develop the standards for grade levels, such as state directors or district early childhood leadership teams, may want to create a set of standards that not only match the development of young children, but build on the skills they need to learn in early intervention and preschool settings for success as they transition.

Integration of Movement

Movement is defined as (a) physical activity that expels energy (Bouchard et al., 1994), (b) discrete physical activities, (c) integrated movement-based activities (IMBAs), and (d) brain breaks (Nalder & Northcote, 2015). “Movement enhances brain function by increasing communication between the cerebellum and the rest of the brain” (Van, 2012, p. 3). Griffen et al., (2011) identified a connection between cognitive brain functioning and exercise in young children. Themes and categories related to engagement, play, fine motor, and brain breaks emerged in relation to movement, but occurred more often in the preschool than in the kindergarten setting unless the kindergarten students were in special area classes.

Engagement

"After periods of focused concentration, the body and brain of the child needs action to rejuvenate to be ready for the next cognitive activity. The challenge for the early childhood educator is to balance those periods of inactivity with activity and to gradually increase the child's ability to pay attention" (Sandberg, Hansen, & Puckett, 2013, para. 6).

The findings from this study provide the field with the consideration that these preschool teachers did perceive movement could impact students' engagement. Preschool teachers (P1, P2 and P3) expressed during interviews that movement has the possibility to impact engagement for the students in their classroom. The P1 and P2 preschool teacher also expressed that they plan their day so children have opportunities to move around and not sit for "too long" because if they do, they will not stay as engaged. All preschool and two kindergarten teachers (P1, P2, P3, K1, K2) expressed in their interview that they had not received any training, formal or informal, about the effects movement has on engagement, but the P2 teacher did express she previously read a research study about how movement impacts children.

Recommendations developed from the connection of the current literature (Sandberg et al., 2013) to current findings are that teacher preparation programs, as well as professional development courses, should have opportunities to educate preschool and kindergarten teachers on effective ways to increase engagement, including the use of movement. Teacher preparation programs and professional development courses need to provide preschool teachers with the research of how and why it is important to implement movement in their classrooms effectively.

Physical Play

Opportunities for physical play are an important aspect of early childhood education and development (Copple & Bredekamp, 2009). Multiple domains of early childhood learning have

been identified to positively impact engagement through opportunities in physical play (Lifter et al., 2011; Milter, Ginsburg, & Mulligan, 2012). More specifically, play opportunities increase children's social skills and language development (O'Connor and Stagnitti, 2011), as well as their motor development (Kenny et al., 2016).

All preschool teachers in this study allowed students multiple opportunities to engage in play outside of recess. P1 taught her students how to play musical chairs while integrating counting, P2 implemented play centers that aligned with reading and mathematics, and P3 provided the students play opportunities aligned with real life skills, such as gardening. During these play opportunities, students were able to engage in a range of physical activity with very limited restrictions placed on the students' movement. The P1 teacher discussed, in her interview, that she is trying to teach her students to work through conflict and be more independent when conflicts arise during free play centers. The findings from preschool cases support the use of play as a way for young children to develop their social emotional skills and their cognitive skills. While the preschool cases support the literature on physical play, the kindergarten cases did not integrate free play opportunities; therefore, no clear evidence emerged on the importance or use of play from the kindergarten cases. This lack of evidence shows, in these kindergarten cases, there is emphasis on more academic development, which is missing the use of developmentally appropriate practices, than the focus on implementing the research and recommendations to create an environment that provides active learning based on the appropriate developmental steps for young children.

Recommendations from the finding on play include that the field of early intervention should consider and implement opportunities for kindergarten students to engage in physical play other than recess. Because kindergarten teachers (K1, K2, and K3) expressed during their

interviews they follow directed lessons and standards to teach children, they noted they had to be creative to find ways to allow children to engage in physical play. They shared that play could only occur if it was incorporated with content from directed lessons and state standards.

Fine Motor

Marr, Cermak, Cohn, and Henderson (2003) provide further details and research that supports the researcher's findings, aligned with the primary movement in mathematics, was the use of fine motor skills. Marr and colleagues (2003) found, on average, Head Start and preschool teachers spend 37% of the day on fine motor activities compared to 46% in kindergarten. Grissmer and colleagues (2010) identified that the combination of students' achievement levels in fine motor skills, attention, and general knowledge during kindergarten are predictors for student's future achievement later on in mathematics, reading, and science.

Data gathered by the researcher in this study indicated one of the main ways preschool teachers integrated movement into their classroom was through the use of activities requiring the use of fine motor skills. As evidenced by the findings of the teacher interviews, teachers did not perceive fine motor skills were opportunities for movement because they did not provide any examples when asked. Yet, all preschool teachers included a daily writing or coloring activity into their schedule requiring all students, including those with DD, to trace, write, or color their names, letters, or pictures. Teachers did mention, for some of their students, that it is difficult for them to sit long enough to engage in a fine motor writing activity. Preschool teachers mentioned, during class observations, they wanted their students to engage in tabletop, fine motor work to prepare them for kindergarten expectations.

The findings from this study support the literature, in that kindergarten students are engaging in a higher percentage of time working on fine motor tasks than preschool students.

Neither preschool nor kindergarten teachers expressed they were integrating fine motor activities because they knew these tasks had an impact on students' achievement. Yet, preschool teachers made an effort to integrate a variety of fine motor activities in reading, writing, mathematics, science, and free play as a way of "getting kids ready" for kindergarten settings.

Recommendations based on study findings and the current literature about how fine motor skills impact children's development include that kindergarten teachers need to develop lessons that provide students opportunities to engage in creative fine motor activities. Kindergarten teachers should integrate fine motor activities that require paper and pencil, but they have the opportunity to enrich the lessons with manipulatives and hands-on materials that also require fine motor skills.

Brain Breaks

> Brain breaks are simple transitional physical and mental exercises designed to equip the teacher with tools to manage the physiology and attention of the class and to keep children in the most receptive state for learning. Enhanced learning through movement (educational kinesiology) increases the oxygen in the bloodstream and leads to improved concentration, which enhances children's readiness to learn. (Weslake & Christian, 2015, p. 39)

While researchers have previously promoted brain breaks to allow students to engage in a high level of physical activity, Weslake and Christian (2015) noted "brain breaks that related to the subject and content and uses moderate amounts of movement…[had a positive impact on] enjoyment and refocus time" (p. 44).

The study findings support the use of brain breaks in preschool and kindergarten settings. Although the researcher could not determine the impact of the brain breaks on student learning other than teachers' perceptions, they did help keep students engaged. All three preschool cases (P1, P2 and P3), and two kindergarten cases (K1 and K3) were observed implementing brain break opportunities in their classrooms. Based on observations, it appeared as though students enjoyed the opportunities for brain breaks because they all participated, to some degree, in the movements. Teachers P1, P2, K1, and K3 expressed that their students enjoyed brain break videos. The P1, P2, P3, and K1 teacher mentioned, during their interview, that while they thought of brain breaks, they perceived that the type of brain break connected to the degree of movement had different impacts on the students. For example, a higher degree of physical activity required an extended amount of time to allow students to calm down before reengagement in a seated activity could happen compared to students who were engaged in moderate degrees of physical activity. In addition, preschool teachers (P1, P2, and P3) were all observed implementing brain breaks. All preschool teachers equated that when students were given a brain break, a video, and music also being included with movement, engagement and learning increased. At first, when preschool teachers were interviewed, music and movement were discussed, but the extent of movements was unknown until observations. Music and movement videos were used as brain breaks for children in between instructional lessons. The music and movement videos provided all students in the class an opportunity to engage in gross motor movements. Preschool teachers' connection of movement to music aligns with current literature in that music and movement are being used together to create a "fluid instructional setting," engaging both the body and the brain (Sandberg, Hansen, & Puckett, 2013, para. 7).

While kindergarten teachers did not engage in brain breaks to the degree the preschool teachers did, they were observed in both early childhood settings. Recommendations of the use of brain breaks needs to be focused on the research of these brain breaks, aligned with learning outcomes. Research needs to be completed to determine what types of brain breaks are more effective, if the degree of physical activity such as moderate to heavy movement impact the brain break, and the differences between incorporating videos and music into a brain break. Identifying information about what types of brain break are the most effective could allow effective implementation of brain breaks in classrooms.

Physical Transitions

Researchers have determined that when students with disabilities transition to kindergarten, kindergarten teachers find they have difficulty with behaviors, such as transitioning throughout the day (Odluyurt & Batu, 2009; Rimm-Kaufman et al., 2000). Sainto (1990) suggests that preschool teachers teach young children how to transition so that a large amount of the instructional day is not lost during these times.

At the onset of the study when preschool teachers were interviewed, they said that they deliberately used transitions from one activity to another to provide their students with an opportunity for movement. Some teachers implemented specific steps for transitioning, but more often than not, students were observed to transition independently after prompted by the teacher. Students were observed to sometimes mini run, side step, skip, hop, and walk during transitions, but the teachers did not correct the behavior unless they were not transitioning to the correct area, being unsafe or disrupting other students. While the summary of the literature related to physical transitions in preschools is about teachers creating more efficient transitions so they can

maximize instructional time, preschool teachers did not provide any evidence of or appear to be frustrated or dislike how the students transition.

Mathematics in Early Childhood Education

Teaching mathematics to young children is most effective when creating an active learning environment that uses movement, manipulatives, objects, and contextualizes concepts to real world experiences (Clements, 2001; Clements and Sarama, 2000; NAEYC, 2009; The National Council of Teachers of Mathematics, 2000). Preschool teachers in this study did make an effort to integrate movement throughout the school day, embedded in different content areas.

Integration

Early childhood teachers are encouraged to integrate mathematics activities throughout the day in order to provide students with a context for learning (NAEYC, 2009). The National Council of Teachers of Mathematics (2000) strongly supports that while mathematics in preschool and kindergarten can come in formal, structured group activities and informal experiences, it is important for teachers to use naturally occurring experiences for engagement. This recommendation is similar to the findings of Clements and Sarama (2000), that mathematics is best embedded into everyday experiences while also using children's informal knowledge to create learning. More specifically, Clements (2001) concludes that "quality mathematics instruction includes providing loads of unit blocks, along with loads of time to use them; asking children to get just enough pencils for everyone in the group; and challenging children to estimate and check how many steps are required to walk to the playground" (p. 270).

The findings of preschool teachers' perceptions of the importance of integrating mathematics throughout the day aligns with the current literature. After interviewing teachers, the data gathered by the researcher indicated preschool teachers perceive that their young students with DD can learn mathematics skills by integrating the information throughout the day compared to an explicit, direct lesson. During the same interview, the preschool teachers were asked if they had received any formal training about how to teach mathematics to young children with and without disabilities, and they all responded no. One conclusion that can be drawn from these cases, along with other interview information, is that teachers' perceptions of integrating mathematics was not a strategy they learned in their teacher preparation program or professional development activities but emerged from the learned experiences in working with young children. These experiences in some cases aligned with NCTM and NAEYC principles, but at other times did not. This area is one that needs to be further investigated to determine why teachers are not implementing the identified best practices in mathematics for young children.

Manipulatives

The integration of objects for learning was first defended by Friedrich Frobel and his creation of educational "gifts" in the 1800s, which are a set of manipulatives used to enrich the development and guide play (Froebel 1885; Manning 2005). Specifically, in mathematics, Clements (2001) emphasized manipulatives and objects as an effective way to teach young children by creating more concrete understanding of sometimes abstract concepts. In the Building Blocks and Pre-K Mathematics curriculums, children's mathematics skills increased because of the use of personalized learning, small groups, technology, supplementary activities, and manipulatives (Clements & Sarama, 2008; Klein et al., 2008).

The findings in this study from preschool cases supports the literature that manipulatives should be used. While conclusions cannot be drawn on the effectiveness of the manipulatives in the classroom because that was not measured in this study, the researcher did observe the use of manipulatives increased the ability for children to engage in the activity, no matter the students' cognitive ability. Recommendations for kindergarten teachers are to work to improve the integration of manipulatives into mathematics activities. While kindergarten teachers were required to use a workbook during mathematics, workbook developers could create lessons that include instruction with manipulatives as well as providing the needed manipulatives in a workbook kit. An additional factor to consider would be how to increase the use of manipulatives and movement, even involving whole body movement, which was observed when students were asked to use the length of their body to measure the size of the classroom. Integrating these types of movement activities into prepackaged curricular materials on a regular basis would align with DEC and NAEYC recommendations and potentially increase student engagement.

Educator Training and Teaching Practices

Literature identified related to differences in teacher performance of alternate certification, compared to traditional teacher certification routes show variations in depth, breadth, and length of time to completion. Darling-Hammond (2000), in a review of literature, identified that teachers who were prepared in a more traditional setting were more confident in their teaching practices. Yet in a study conducted by Miller, McKenna, and McKenna (1998), the researchers identified no significant differences in teacher practices when observed in the classroom of teacher who obtained alternate certification compared to traditional certification. In

addition, no significant differences were identified in student achievement of the students who were taught by an alternative certified teacher compared to a traditionally certified teacher.

The results of this study, related to educator preparation and teacher practices, more often than not, parallel the findings of researchers who identify differences do exist in alternative certification compared to traditional certification. The P1 and P2 teachers both expressed, during their interview, that they went through a traditional teacher undergraduate program, and when observing these cases more instances of movement in the integration of mathematics throughout the day surfaced compared to the P3 case. The P3 case teacher, during her interview, disclosed she received her teacher preparation program and certification through and alternative route. This pattern is similar for the kindergarten cases. The K3 teacher received his formal education through a traditional undergraduate program and displayed more instances of using movement as an instructional strategy compared to the K1 and K2 teachers whom were both alternatively certified. These findings provide beginning evidence that further exploration is needed about the potential differences and impact of movement coming from professional development, traditional preparation programs and on the job training for the alternatively certified teachers. Some interesting patterns emerged in this study, but further investigation is needed in this area.

Recommendations and Future Research

The purpose of the study was to examine and provide a detailed description of movement and the integration of movement in mathematics for consideration in future research and current practices. Recommendations and suggested future research areas that emerged from this study are presented to further guide the field of early childhood about teacher practice, teacher preparation, policy, educational material development, and evidence based research for

implementing movement in early childhood settings as well as areas to consider that may be unique or not to Head Start and Title I settings.

Teacher Practice

Implementing the DEC recommended practices

Teachers expressed they were uncertain what the DEC recommended practices were, although they were teaching young children with disabilities in an inclusive setting. Teacher preparation programs, as well as professional development activities, should include information to educate pre-service and in-service educators about the DEC recommended practices. These practices also should be considered by publishers and curriculum development specialists to ensure best practices are used in lessons and materials in early childhood settings.

Implementing the NAEYC Principles and DAPs

While the principles of the NAEYC were observed more in preschool than kindergarten, there were still opportunities for an increase in the use of these principles in both settings. Teacher preparation programs, as well as professional development activities should include information to educate pre-service and in-service educators about the NAEYC principles and DAPs. Again, these principles should be a framework for the development of material, specifically created for children, birth to age eight, by curriculum development companies and curriculum specialists in schools and districts.

Active Learning Environments

Teachers need to be provided with more resources to create environments that promote active learning. Teachers have the ability to plan lessons that incorporate movement and active

learning, but they need to be empowered to use best practices in active learning and movement without fear of leaving "their curriculum frameworks." Opportunities should be considered as to how to actively engage children in lessons that simply involve the use of only the fine motor skills of using a paper and pencil. Jobs of the future for individuals with disabilities most likely require students with DD to use skills beyond just writing (e.g., technology, programming).

Across Grade Level Planning

Preschool and kindergarten teachers have the ability to plan lessons and long-range plans together in order to create a bridge between the two settings. A need exists for consistency and integration of the DAPs and DEC recommended practices across all early childhood settings.

Enrichment of Lessons

Kindergarten teachers did not consistently integrate manipulatives and objects into their lessons. The use of paper and pencil, at times, limits opportunities to engage all students at different levels. Kindergarten teachers should be encouraged and lessons should be designed for easier and richer integration and implementation of manipulatives into teaching in general, but specifically, in teaching mathematics concepts.

Teacher Preparation and Professional Development

Movement Education

Teachers expressed they did not receive any formal education or professional development related to the integration of movement. Teacher preparation programs, as well as professional development activities, should educate pre-service and in-service teachers about why movement is important and how to effectively integrate movement into deeper learning.

While the study was conducted in low-income school settings for children in both Head Start and Title One understanding if and how teachers are being trained in those settings to implement movement education can be helpful for creating effective professional development. In addition, determining if teachers in low-income settings are being trained differently than their counterparts in more affluent preschool and kindergarten settings can also impact professional development, with the chance that the teachers should be trained based on the type of setting they are teaching in.

Policy and Education Material Development

Policy Development of Developmentally Appropriate Standards

Lessons that provide children with active engagement through movement are developmentally appropriate; yet, the standard restrictions and expectations placed on kindergarten teachers limits how they integrate movement throughout the day. Teachers need more flexibility to provide instruction that is individualized and tailored to a student's unique learning needs.

Workbook Developers

Kindergarten teachers were limited to how they taught mathematics because of the requirements and expectations for completing the mathematics workbook. Workbook developers have the opportunity to create lessons that require the use of manipulatives and movement to complete these activities. Teachers and students, alike, might benefit from a better integration and review by curriculum developers of developmentally appropriate ways of learning in early childhood. Teachers in low-income school settings that serve young children in Head Start and Title One, at times are mandated to use textbooks developed for young children. Understanding

if those textbooks have been developed specifically for the unique needs of young children in low-income school settings has the potential to impact not only what the teachers are teaching but also the performance of children. Because Head Start and Title One teachers in inclusive settings at times encounter additional obstacles that may not be addressed by workbook developers, the potential to provide those teachers with more flexibility in their teaching could overall impact student performance.

Research

Brain Break Research

Teachers expressed that different types of brain breaks affect students differently, yet limited research exists on different brain breaks and more so, how brain breaks impact student learning. Further research is needed on how different types of brain breaks impact student learning, and if one type is more effective than another. Overall, research is needed as to how brain breaks directly impact all areas of development; and if an increase in early childhood settings, including kindergarten, could influence learning of all students, including students with DD. In addition, completing a comparison of low-income school settings to more affluent school settings to determine if one allows for more movement brain breaks than another could impact how and the degree that movement breaks need to be included in those types of settings.

ActiGraph Data

The use of emerging biophysical devices is on the rise. Further research is needed on the use of devices, such as the ActiGraph, to better understand how this data aligns with learning, and more importantly, inform teacher practice. Data from the ActiGraph could present a teacher with data as to which student needs more movement, allowing teachers to individualize activities

for students. The ActiGraph and other such devices on the market could also provide data related to sedentary behavior and the degree of physical activity for future understanding of student behavior and research.

Limitations

Limitations are provided to show a clear picture of factors that potentially impacted the findings of the study. Limitations of this study include:

Recruitment of study participants

Teacher study participants were not chosen randomly. School administrators suggested teachers that meet the study criteria for inclusion in the study.

Student participants

The number of student participants was not homogenous between cases. For example, P1 included one student participant, compared to P2 who had five student participants. This limitation may have potentially impacted the homogeneity of the ActiGraph results because the amount and degree of movement could be skewed between and within cases.

Setting of Schools

All of the classrooms were located in low-income communities, and while the findings of this study may be generalized to similar settings, the findings cannot be generalized to non-similar settings.

Teacher Survey

Based on the way the teacher survey was created, it did not provide extremely sensitive data, and therefore, the conclusions drawn from survey responses provided limited information.

Days of Observations

The K1 and K2 cases were observed for four days total because of uncontrollable factors; compared to the P1, P2, P3 and K3 cases which were observed for five days total. While large amounts of data were collected from the K1 and K2 cases, it was still less than that of other cases.

End of the Year

Data collection for this study occurred in the last two months of the school year. Teachers suggested that they were concerned about what information may be gained from observations because some of their instructional time was spent on end-of-the-year testing and may not reflect what the majority of lessons might look like throughout the school year.

Conclusions

In this study, the researcher utilized a mixed method design examining multiple preschool and kindergarten cases to determine if the teachers' perceptions and practices aligned with recommended, effective instructional strategies and level of movement. This mixed method approach was used to gain information and provide a detailed description of how movement was alike or different, in preschool and kindergarten classrooms, in the area of movement and in mathematics. As noted in the literature, movement is important to the development of young

children (Division for Early Childhood, 2014), and this study exposed the variety and degree of how preschool and kindergarten teachers are effectively using or are lacking the use of movement in their classrooms. While kindergarten students were observed quantitatively engaging in more movement, as determined by steps taken and collected by the ActiGraph, the type of movement in both classrooms in general and the integration of movement in mathematics varied and appeared more consistent in preschool cases.

The researchers' review of movement and instructional practices in a sample of preschool and kindergarten cases contribute to the scant literature on the use of movement in these settings for children with DD. These findings provide an extension to future literature and a foundation for future research of movement in classrooms. A clear need exists to further examine the implications of pre-service and in-service teacher preparation activities in the classroom, as recommended in the findings. Furthermore, in order to impact what is occurring in preschool and kindergarten settings a "top down" model may need to be implemented. The change process to increase movement and enrich learning through movement should first begin by policy makers and national, state, and local leadership understanding what is developmentally appropriate for young children. This level of leadership and policies need to influence the textbook companies to ensure the tools being purchased by taxpayers funds do align with what we know is best practice. School administrators and district personnel should then review these educational materials further before adoption to ensure that classroom teachers are not left teaching a mandated curriculum that does not reflect developmentally appropriate practices. These steps are important so that teachers in Head Start and Title One settings whom at times are already overwhelmed with a range of children with an array of needs are not having to use their limited time and recourses to create developmentally appropriate adaptations to a mandated tool paid for by the

district. Ultimately, the successful development--and subsequent execution--of curriculum for students at the early intervention level will rely heavily on a combination of comprehensive research, the continued publishing of robust literature, and a shared community interest for a more effective scaffolding structure between preschool and kindergarten settings to ensure the alignment of DAP and DEC practices to provide the best outcomes for all kids, including children with DD.

APPENDIX A: DATA COLLECTION CHECKLIST

Data Completion Checklist

Teacher	Student #1	Student #2	Student #3	Consent	Interview	Survey	Class Schedule	Lesson Plan	Observation Day #1	Observation Day #2	Observation Day #3	Observation Day #4	Observation Day #5	COMMENTS
A1														
A2														
A3														
A4														
A5														
B1														
B2														
B3														
B4														
B5														

APPENDIX B: TEACHER INTERVIEW QUETIONS

Demographic Questions

1. What grade do you teach?
2. How long have you been teaching?
3. What is your educational background?
4. How many credits did you take in mathematics in college?
5. Do you have any previous experience with students with disabilities?
   4b. If yes, please describe your experience(s).

Questions

6. What does an average day look like in your classroom?
7. What types of activities do you teach in your classroom?
8. What types of instructional strategies do you use in your teaching?
9. What does movement look like in your classroom?
10. Do you integrate movement into your class activities?
    9b. If yes, how is movement integrated into your class activities?
11. What does mathematics instruction look like in your classroom?
12. Do you integrate movement into your mathematics activities?
    11b. IF yes, how do you integrate movement in your mathematics activities?

APPENDIX C: CLASSROOM SCHEDULE ARTIFACT

Pre-K Classroom Schedule

[redacted]

8:15-9:00	Breakfast/All Centers Open (bathroom/wash hands)
9:00-9:15	Journals
9:15-9:45	Morning Ritual/ Circle Time
9:45-11:00	Exploration Stations (M-Math, T-Reading, W-Writing, Th-Fine Motor, F-Social) (bathroom/wash hands)
11:00-11:30	Playground
11:30-11:45	Music and Movement or Story Time (water break/wash hands)
11:45-12:15	Lunch
12:15-12:30	Bathroom Rotation
12:30-2:00	Brain Break/Rest Time
2:00-2:15	Afternoon Snack (bathroom/wash hands)
2:15-2:45	Exploration Stations
2:45-3:00	Closing Circle/Dismissal/Aftercare

allow time between activities for transitions

APPENDIX D: WEEKLY LESSON PLAN ARTIFACT

	Beyond Centers and Circle Time		
	Classr [redacted]	**Number:** 1-20	**Color:** Review Colors
	Date: Week 31: April 9-13	**Letter:** Aa-Zz	**Shapes:** Review 2D Shapes
	Theme: Insects, Bugs & Spiders	Zoo-Phonics	**Concept:** Lifecycle- Butterfly, Ladybug

What do I want my students to know? What do I want my students to be able to do?	Students will learn about insects, bugs, and spiders with the use of visuals, books, and hands-on experiences. Students will explore different topics throughout this unit such as the life cycle of a butterfly and a ladybug. Students will participate in inquiry learning and investigation through project based learning and hands-on tasks. Students will develop a greater understanding of insects, bugs, and spiders through play based learning.
Vocabulary	insects, bugs, spiders, eggs, caterpillar, chrysalis, butterfly, ladybug, bee, ant, spider, cockroach, beetle, dragonfly, moth, grasshopper, praying mantis, leaf, dirt, worm, rhyming words, sight words, cvc words, Aa, Bb, Cc, Dd, Ee, Ff, Gg, Hh, Ii, Jj, Kk, Ll, Mm, Nn, Oo, Pp, Qq, Rr, Ss, Tt, Uu, Vv, Ww, Xx, Yy, Zz, number, 1-20, color, white, shades of blue, shades of brown, shades of green, shades of red, shape, circle, triangle, square, heart, star, rectangle, oval, octagon, opposites, big, small, pattern, directional words, up, down, under, over, on, off above, below, same, different, etc.
Assessments (How will I know if they understand?)	I will assess student learning through informal observations and anecdotal notes when necessary. Students will be able to answer higher order thinking questions. When tracking IEP goals, I will use teacher developed checklists and documented observations.
Materials & Resources	books related to theme, circle time visuals, dry erase board, markers, crayons, pencils, paint, paint brushes, scissors, glue sticks, shape/color matching game, alphabet unlock game, number linking game, number car game, playdough, playdough mats, boardmaker, lessonpix, speakaboos, zoo-phonics materials, classdojo.

Art Integration/ Technology Components: UDL	Art and Technology is integrated daily. Art is integrated during morning opening activities/arts & crafts time as well as during centers through hands-on PBL art projects. Technology is integrated daily during circle time when using boardmaker and classdojo. Technology is also used when singing and participating in music and movement activities.				
	M	T	W	T	F
Notes/Special Reminders			Early Release Day		Send home student work from the week (save one for student portfolio).
Breakfast & Opening Activities: All Centers Open 8:15 -9:00	Standards: Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.				
	Breakfast is being served while all centers are open. Free play: writing table (w/ crayons, markers, pencils, dry erase), blocks, dramatic play, and books associated to the weekly theme. (bathroom/wash hands)				
Journals 9:00-9:15	Standards: Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.				
	Students will respond to daily journal prompts through the use of written expression and pictures.				
	Write letters F-J.	Draw a butterfly.	Write your name.	Draw an ant.	Be Creative!
	Standards: Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.				

Morning Ritual/ Circle Time 9:15-9:45	Greeting song, review school rules, calendar skills (days of the week, months of the year), themed activity, letters with zoo phonics, count children, identifying numbers 1-20, positional words.	Greeting song, review school rules, calendar skills (days of the week, months of the year), themed activity, letters with zoo phonics, count to 100, basic addition (addends less than 10).	Greeting song, review school rules, calendar skills (days of the week, months of the year), letters with zoo phonics, count children, identifying numbers 1-20, positional words.	Greeting song, review school rules, calendar skills (days of the week, months of the year), themed activity, letters with zoo phonics, count to 100, basic addition (addends less than 10).	Greeting song, review school rules, calendar skills (days of the week, months of the year), themed activity, letters with zoo phonics, numbers and counting, student choice book, yoga, or dancing.
Exploration Stations 9:45-11:00 (M-Math, T-Reading, W-Writing, Th-Fine Motor, F-Social)	Standards: Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.				
	Focus: Math *Sorting Cut & Paste *Insect Measuring *Roll & Cover (g1, g2), Number Clip Cards (g3, g4, g5). *Number cars *Blocks	Focus: Reading *Ladybug Matching/Letters *Insects Emergent Reader Book *Zoo-Phonics Bingo/ CVC Words *Puzzles *Library	Focus: Writing *Name Pratice *White Boards *Writing Sentences with Sight Words (g1, g2), zoo-phonics (g3, g4, g5). *Playdough mats *Kitchen	Focus: Fine Motor *Magnets Exploration *Butterfly Craft *Zoo-Phonics Bingo *Bug Puzzle *Blocks	Focus: Social *Watercolor bugs (choice of bug picture) *Zoo-Phonics letter smack *Flower Sensory Bins *Jake Legos *Kitchen
Playground: Outside Learning & Gross Motor Skills 11:00-11:35	Physical Development A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, B.1, B.2, C.1, C.2, D.1, D.2, D.3. Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2,				
	Practice gross motor skills- Focus on IEP goals. Games to Play: Follow the leader, Head Shoulders Knees & Toes, Hide & Go Seek, Tag.				
Music & Movement	Standards: Physical Development A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, B.1, B.2, C.1, C.2, D.1, D.2, D.3. Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.				

11:35-11:45	Water Break. Teacher led music & movement. Jack Hartmann, GoNoodle, Just Dance Kids, Cosmic Kids Yoga, Boardmaker, Preschool Gym CD: stretches, coordination, marching, etc. Transition to story time and lunch.
Storytime 11:45-12:00	Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2, D.a.3, D.b.1, D.b.2, D.b.3, D.c.1, D.c.2, D.c.3, D.d.1, D.d.2, D.d.3.
	Teacher reads a book (related to weekly theme). Class discussion about book. Talk about first, next, last in the book, talk about front and back of book. Students prepare for lunch (bathroom/wash hands).
Lunch 12:00-12:30	Physical Development A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, B.1, B.2, C.1, C.2, D.1, D.2, D.3. Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1
	Students will eat lunch and cleanup their area. Students will participate in toileting routine. Transition to brain break/ nap time.
Brain Break/ Rest Time 12:30-2:00	Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4.
	Quiet music, nap time.
Afternoon Snack/ Exploration Stations 2:00-2:45	Physical Development A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, B.1, B.2, C.1, C.2, D.1, D.2, D.3. Approaches to Learning A.1, B.1, C.1, D.1. Social and Emotional Development A.a.1, A.a.2, A.b.1, A.b.2, A.b.3, B.a.1, B.b.1, B.b.2, B.b.3, B.c.1, C.1, C.2. Language, Communication, and Emergent Literacy A.1, A.2, B.1, C.1, C.2, D.1, D.2, E.1, E.2, E.3, F.1, F.2, F.3, F.4, G.1, G.2, G.3, G.4. Cognitive Development and General Knowledge: Mathematical Thinking A.a.1, A.a.2, A.a.3, A.a.4, A.a.5, A.a.6, A.b.1, A.b.2, A.b.3, A.c.1, A.c.2, A.d.1, A.d.2, A.d.3, A.d.4, A.e.1, A.e.2, A.e.3, A.e.4, A.f.1, A.f.2, A.f.3, A.f.4. Scientific Inquiry B.a.1, B.a.2, B.b.1, B.c.1, B.c.2, B.c.3, B.d.1, B.d.2, B.e.1. Social Studies C.a.1, C.a.2, C.a.3, C.b.1, C.c.1, C.d.1, C.d.2. Creative Expression through the Arts D.a.1, D.a.2,
	Students will wake up and eat afternoon snack. Students will participate in toileting routine. Students will clean up their area and participate in afternoon exploration stations. Afternoon playground time: 2:20-2:40 (optional).

Closing Circle: Classroom discussion, teacher directed activities, music and movement. 2:45-3:00	Students will talk about what they learned at school, highs and lows from the day, and listen to a story.	Students will talk about what they learned at school, highs and lows from the day, and dance GoNoodle.	Students will talk about what they learned at school, highs and lows from the day, and listen to a story.	Students will talk about what they learned at school, highs and lows from the day, and dance GoNoodle.	Students will talk about what they learned at school, highs and lows from the day, and dance to kids choice music!
Dismissal/ Aftercare 3:00	Students pack up and go home. Speak to parents/take children to aftercare.				
Accommodations for Differentiated Learners (What will I do if they don't understand? What will I do if they have already mastered the standard?)	*Visual Schedule. *Allow time between activities for transitions. *Small groups or one-on-one support based on student needs. *Supervision to ensure safety. *A sensory center will be available for students. *When writing, students can trace letters that are written with a highlighter or use playdough. This helps these students visualize letters or numbers and practice fine motor skills. *Hand over hand assistance when needed. *Students with higher abilities can work with students with lower abilities to model various skills and concepts.				
Lesson Reflection: What went well? What didn't work? Ideas for next time.	Group 1: Ethan, Mishell ; Group 2: Kairi, James, Leila ; Group 3: Mali, Lamar, Jaxiel ; Group 4: Kendrick, Walaysia ; Group 5: Esther, Cantrell				

APPENDIX E: OBSERVATION TOOL

Date_____ Class_____ Time Start_____

Type of Movement	Code
Physical Activity	PA
Discrete Physical Activity	DPA
Integrated movement based activity	IMBA
Brian breaks	BB

Math

Math & Movement

Reflections

APPENDIX F: TEACHER SURVEY

Perceptions of The Importance of Instructional Strategies

*The questions for this survey have been adopted and modified from the Recommended Practices from the Division for Early Childhood (2014).

Instructions: Please evaluate each readiness skill and instructional strategy. Use the scale presented to rank the readiness skills and instructional strategy based on importance.

		Very Important	Somewhat Important	Not Important
		3	**2**	**1**
	START HERE			
1.	Leaders create a culture and a climate in which practitioners feel a sense of belonging and want to support the organization's mission and goals.	**3**	**2**	**1**
2.	Leaders promote adherence to and model the DEC Code of Ethics, DEC Position Statements and Papers, and the DEC Recommended Practices.	**3**	**2**	**1**
3.	Leaders develop and implement policies, structures, and practices that promote shared decision making with practitioners and families.	**3**	**2**	**1**
4.	Leaders belong to professional association(s) and engage in ongoing evidence based professional development.	**3**	**2**	**1**
5.	Leaders advocate for policies and resources that promote the implementation of the DEC Position Statements and Papers and the DEC Recommended Practices.	**3**	**2**	**1**
6.	Leaders advocate for policies and resources that promote the implementation of the DEC Position Statements and Papers and the DEC Recommended Practices.	**3**	**2**	**1**
7.	Leaders develop, refine, and implement policies and procedures that create the conditions for practitioners to implement the DEC Recommended Practices.	**3**	**2**	**1**
8.	Leaders work across levels and sectors to secure fiscal and human resources and maximize the use of these resources to successfully implement the DEC Recommended Practices.	**3**	**2**	**1**
9.	Leaders develop and implement an evidence-based professional development system or approach that provides practitioners a variety of supports to ensure they have the knowledge and skills needed to implement the DEC Recommended Practices.	**3**	**2**	**1**
10.	Leaders ensure practitioners know and follow professional standards and all applicable laws and regulations governing service provision.	**3**	**2**	**1**

11.	Leaders collaborate with higher education, state licensing and certification agencies, practitioners, professional associations, and other stakeholders to develop or revise state competencies that align with DEC, Council for Exceptional Children (CEC), and other national professional standards.	**3**	**2**	**1**
12.	Leaders collaborate with stakeholders to collect and use data for program management and continuous program improvement and to examine the effectiveness of services and supports in improving child and family outcomes.	**3**	**2**	**1**
13.	Leaders promote efficient and coordinated service delivery for children and families by creating the conditions for practitioners from multiple disciplines and the family to work together as a team.	**3**	**2**	**1**
14.	Leaders collaborate with other agencies and programs to develop and implement ongoing community-wide screening procedures to identify and refer children who may need additional evaluation and services	**3**	**2**	**1**
15.	Practitioners work with the family to identify family preferences for assessment processes.	**3**	**2**	**1**
16.	Practitioners work as a team with the family and other professionals to gather assessment information.	**3**	**2**	**1**
17.	Practitioners use assessment materials and strategies that are appropriate for the child's age and level of development and accommodate the child's sensory, physical, communication, cultural, linguistic, social, and emotional characteristics.	**3**	**2**	**1**
18.	Practitioners conduct assessments that include all areas of development and behavior to learn about the child's strengths, needs, preferences, and interests.	**3**	**2**	**1**
19.	Practitioners conduct assessments in the child's dominant language and in additional languages if the child is learning more than one language.	**3**	**2**	**1**
20.	Practitioners use a variety of methods, including observation and interviews, to gather assessment information from multiple sources, including the child's family and other significant individuals in the child's life.	**3**	**2**	**1**
21.	Practitioners obtain information about the child's skills in daily activities, routines, and environments such as home, center, and community.	**3**	**2**	**1**
22.	Practitioners use clinical reasoning in addition to assessment results to identify the child's current levels of functioning and to determine the child's eligibility and plan for instruction.	**3**	**2**	**1**
23.	Practitioners implement systematic ongoing assessment to identify learning targets, plan activities, and monitor the child's progress to revise instruction as needed.	**3**	**2**	**1**
24.	Practitioners use assessment tools with sufficient sensitivity to detect child progress, especially for the child with significant support needs.	**3**	**2**	**1**
25.	Practitioners report assessment results so that they are understandable and useful to families.	**3**	**2**	**1**

26.	Practitioners provide services and supports in natural and inclusive environments during daily routines and activities to promote the child's access to and participation in learning experiences.	**3**	**2**	**1**
27.	Practitioners consider Universal Design for Learning principles to create accessible environments.	**3**	**2**	**1**
28.	Practitioners work with the family and other adults to modify and adapt the physical, social, and temporal environments to promote each child's access to and participation in learning experiences	**3**	**2**	**1**
29.	Practitioners work with families and other adults to identify each child's needs for assistive technology to promote access to and participation in learning experiences.	**3**	**2**	**1**
30.	Practitioners work with families and other adults to acquire or create appropriate assistive technology to promote each child's access to and participation in learning experiences.	**3**	**2**	**1**
31.	Practitioners create environments that provide opportunities for movement and regular physical activity to maintain or improve fitness, wellness, and development across domains.	**3**	**2**	**1**
32.	Practitioners build trusting and respectful partnerships with the family through interactions that are sensitive and responsive to cultural, linguistic, and socioeconomic diversity.	**3**	**2**	**1**
33.	Practitioners provide the family with up-to-date, comprehensive and unbiased information in a way that the family can understand and use to make informed choices and decisions.	**3**	**2**	**1**
34.	Practitioners are responsive to the family's concerns, priorities, and changing life circumstances.	**3**	**2**	**1**
35.	Practitioners and the family work together to create outcomes or goals, develop individualized plans, and implement practices that address the family's priorities and concerns and the child's strengths and needs.	**3**	**2**	**1**
36.	Practitioners support family functioning, promote family confidence and competence, and strengthen family-child relationships by acting in ways that recognize and build on family strengths and capacities.	**3**	**2**	**1**
37.	Practitioners engage the family in opportunities that support and strengthen parenting knowledge and skills and parenting competence and confidence in ways that are flexible, individualized, and tailored to the family's preferences	**3**	**2**	**1**
38.	Practitioners work with the family to identify, access, and use formal and informal resources and supports to achieve family-identified outcomes or goals.	**3**	**2**	**1**
39.	Practitioners provide the family of a young child who has or is at risk for developmental delay/disability, and who is a dual language learner, with information about the benefits of learning in multiple languages for the child's growth and development.	**3**	**2**	**1**
40.	Practitioners help families know and understand their rights.	**3**	**2**	**1**
41.	Practitioners inform families about leadership and advocacy skill-building opportunities and encourage those who are interested to	**3**	**2**	**1**

	participate.			
42.	Practitioners, with the family, identify each child's strengths, preferences, and interests to engage the child in active learning.	**3**	**2**	**1**
43.	Practitioners, with the family, identify skills to target for instruction that help a child become adaptive, competent, socially connected, and engaged and that promote learning in natural and inclusive environments.	**3**	**2**	**1**
44.	Practitioners gather and use data to inform decisions about individualized instruction.	**3**	**2**	**1**
45.	Practitioners plan for and provide the level of support, accommodations, and adaptations needed for the child to access, participate, and learn within and across activities and routines.	**3**	**2**	**1**
46.	Practitioners embed instruction within and across routines, activities, and environments to provide contextually relevant learning opportunities.	**3**	**2**	**1**
47.	Practitioners use systematic instructional strategies with fidelity to teach skills and to promote child engagement and learning.	**3**	**2**	**1**
48.	Practitioners use explicit feedback and consequences to increase child engagement, play, and skills.	**3**	**2**	**1**
49.	Practitioners use peer-mediated intervention to teach skills and to promote child engagement and learning.	**3**	**2**	**1**
50.	Practitioners use functional assessment and related prevention, promotion, and intervention strategies across environments to prevent and address challenging behavior.	**3**	**2**	**1**
51.	Practitioners implement the frequency, intensity, and duration of instruction needed to address the child's phase and pace of learning or the level of support needed by the family to achieve the child's outcomes or goals.	**3**	**2**	**1**
52.	Practitioners provide instructional support for young children with disabilities who are dual language learners to assist them in learning English and in continuing to develop skills through the use of their home language.	**3**	**2**	**1**
53.	Practitioners use and adapt specific instructional strategies that are effective for dual language learners when teaching English to children with disabilities.	**3**	**2**	**1**
54.	Practitioners use coaching or consultation strategies with primary caregivers or other adults to facilitate positive adult-child interactions and instruction intentionally designed to promote child learning and development.	**3**	**2**	**1**
55.	Practitioners promote the child's social-emotional development by observing, interpreting, and responding contingently to the range of the child's emotional expressions.	**3**	**2**	**1**
56.	Practitioners promote the child's social development by encouraging the child to initiate or sustain positive interactions with other children and adults during routines and activities through modeling, teaching, feedback, or other types of guided support.	**3**	**2**	**1**

57.	Practitioners promote the child's communication development by observing, interpreting, responding contingently, and providing natural consequences for the child's verbal and non-verbal communication and by using language to label and expand on the child's requests, needs, preferences, or interests.	**3**	**2**	**1**
58.	Practitioners promote the child's communication development by observing, interpreting, responding contingently, and providing natural consequences for the child's verbal and non-verbal communication and by using language to label and expand on the child's requests, needs, preferences, or interests.	**3**	**2**	**1**
59.	Practitioners promote the child's problem-solving behavior by observing, interpreting, and scaffolding in response to the child's growing level of autonomy and self-regulation.	**3**	**2**	**1**
60.	Practitioners representing multiple disciplines and families work together as a team to plan and implement supports and services to meet the unique needs of each child and family.	**3**	**2**	**1**
61.	Practitioners and families work together as a team to systematically and regularly exchange expertise, knowledge, and information to build team capacity and jointly solve problems, plan, and implement interventions.	**3**	**2**	**1**
62.	Practitioners use communication and group facilitation strategies to enhance team functioning and interpersonal relationships with and among team members.	**3**	**2**	**1**
63.	Team members assist each other to discover and access community-based services and other informal and formal resources to meet family-identified child or family needs.	**3**	**2**	**1**
64.	Practitioners and families may collaborate with each other to identify one practitioner from the team who serves as the primary liaison between the family and other team members based on child and family priorities and needs.	**3**	**2**	**1**
65.	Practitioners in sending and receiving programs exchange information before, during, and after transition about practices most likely to support the child's successful adjustment and positive outcomes.	**3**	**2**	**1**
66.	Practitioners use a variety of planned and timely strategies with the child and family before, during, and after the transition to support successful adjustment and positive outcomes for both the child and family.	**3**	**2**	**1**

* Division for Early Childhood. (2014). DEC recommended practices in early intervention/early childhood special education 2014. Retrieved from http://www.dec-sped.org/recommendedpractices

The highlighted survey items align with the concepts addressed in the research study; transitions, instructional strategies, and opportunities for movement.

APPENDIX G: INSTITUTIONAL REVIEW BOARD APPROVAL

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

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Faith Noelle Ezekiel-Wilder**

Date: **February 08, 2018**

Dear Researcher:

On 02/08/2018 the IRB approved the following modifications / human participant research until 02/07/2019 inclusive:

Type of Review:	Submission Correction for UCF Initial Review Submission Form Expedited Review Category #6 and #7 *This approval includes an authorization for one parental signature for the minor participants* n=40 (10 adults and 30 minors)
Project Title:	An Examination of Movement in Preschool and Kindergarten Classrooms for Young Children with Disabilities
Investigator:	Faith Noelle Ezekiel-Wilder
IRB Number:	SBE-18-13727
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

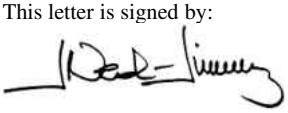
If continuing review approval is not granted before the expiration date of 02/07/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a signed and dated copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

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

This letter is signed by:



Signature applied by Jennifer Neal-Jimenez on 02/08/2018 11:46:31 AM EST

Designated Reviewer

APPENDIX H: EMAIL SCRIPT

Hello_____,

My name is Faith Ezekiel-Wilder and I am a Doctoral Candidate at the University of Central. I am currently working to fulfill my requirement for my dissertation and I would love to speak with you further about observing some of the teachers and students at your school.

The purpose of my research is to examine and describe the difference in preschool and kindergarten classroom settings, as it pertains to movement and movement-based mathematics activities, for young children with disabilities. In my study, I will be interviewing observing and asking participating teachers to complete a survey, and provide lesson plans and a classroom schedule. In addition, I would like to observe a minimum of two students with disabilities in each participating teacher's class and track their number of steps and sedentary behavior with an ActiGraph accelerometer.

I will be happy to provide you with any additional information you need. Please let me know a good time to speak with you further about my study.

Faith Ezekiel-Wilder
Doctoral Candidate, Exceptional Education
University of Central Florida
[redacted]
f.ezekiel.wilder@knights.ucf.edu

University of Central Florida IRB
IRB NUMBER: SBE-18-13727
IRB APPROVAL DATE: 02/08/2018
IRB EXPIRATION DATE: 02/07/2019

APPENDIX I: INFORMED CONSENT PARENT/GUARDIAN

An Examination of Movement in Preschool and Kindergarten Classrooms for Young Children with Disabilities

Informed Consent

Principal Investigator: *Faith Ezekiel-Wilder, Doctoral Candidate*

Co-Investigator(s): *Lisa Dieker, PhD*

Faculty Advisor: *Lisa Dieker, PhD*

Investigational Site(s): *Head Start Preschool or Title One Kindergarten Orange County, FL.*

How to Return this Consent Form: You are provided with two copies of this consent form. If you give consent for your child to participate in the research, please sign one copy and return it to your child's teacher and keep the other copy for your records.

Introduction: Researchers at the University of Central Florida (UCF) study many topics. To do this we need the help of people who agree to take part in a research study. You are being asked to allow your child to take part in a research study which will include about 30 students and 10 teachers in different Head Start preschools and Title One kindergartens. Your child is being invited to take part in this research study because he or she is a student in the participating teacher's class that has been identified to have a disability and is either in a Head Start preschool classroom between the ages of 3-4 or in a Title One kindergarten classroom between the ages of 5-6.

The person doing this research is Faith Ezekiel-Wilder, Doctoral Candidate of the Department of Exceptional Education in the College of Child, Family and Community Sciences at UCF. Because the researcher is a graduate student, she is being guided by Lisa Dieker, PhD, a UCF faculty advisor in the Department of Exceptional Education in the College of Child, Family and Community Sciences.

What you should know about a research study:

- Someone will explain this research study to you.
- A research study is something you volunteer for.
- Whether or not you take part is up to you.
- You should allow your child to take part in this study only because you want to.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide it will not be held against you or your child.

Permission to Take Part in a Human Research Study

- Feel free to ask all the questions you want before you decide.

Purpose of the research study: The purpose of this study is to look at the differences in movement between preschool and kindergarten classroom settings for young children with disabilities. By watching classroom teachers, looking at teachers' schedules, lessons plans and interviews the researcher wants to see how movement is happening in the classroom. By collecting accelerometer data (a simple device that shows how much a child moves) the researcher will be able to tell how much children are moving throughout the day. The purpose of finding out how much kids move and during what activities is to help make classrooms with more movement to help kids moving from preschool to kindergarten classrooms.

What your child will be asked to do in the study: Each child will be asked to wear an ActiGraph Accelerometer Device. This device will be clipped to your child's waist and will tell the research how much movement occurred during the day such as how many times they took steps versus sat still. Your child will be asked to wear the device during the time that the researcher is watching the classroom, this will be for a total of 5 days spread out over a 12 week period. You child will be asked to wear the device for the entire school day, about 7 hours during those 5 days of observation. The teacher will clip the device on your child's waist band at the begninng of the day and remove it at the end of the school day. Your child will only wear this device on the days that the teacher is being observed and it will be removed if for some reason your child does not want to wear it.

Location: This research study will take place in your child's school and classroom. You nor your child is required to travel for participation in this research study.

Time required: We expect that your child will be in this research study for a total of 12 weeks. During those 12 weeks your child will be observed and wear the Actigraph accelerometer for a total of 5 days and approximately 7 hours each day.

Risks: There are no expected risks for taking part in this study. There are no reasonably foreseeable risks or discomforts involved in taking part in this study.

Compensation or payment: There is no compensation, payment or extra credit for your child's part in this study.

Confidentiality: We will limit your personal data collected in this study. Efforts will be made to limit your child's personal information to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of UCF.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints, or think the research has hurt you, talk to:

Faith Ezekiel-Wilder, Graduate Student & Doctoral Candidate, Exceptional Education Program, College of Child, Family and Community Sciences [redacted] or Dr. Lisa Dieker, Faculty Supervisor, Department of Exceptional Education at (407) 823-5885 or by email at lisa.dieker@ucf.edu.

UCF IRB Version Date: 01/2010

IRB contact about you and your child's rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901. You may also talk to them for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You want to get information or provide input about this research.

Withdrawing from the study:
If you decide to have your child leave the study, contact the investigator so that the investigator can send home an official letter stating that data is no longer being collected on your child. The person in charge of the research study can remove your child from the research study without your approval. Possible reasons for removal include if your child misses more than 2 days of observations or if they fail to wear the ActiGraph Accelerometer device. We will tell you and your child about any new information that may affect your child's health, welfare or your choice to have your child stay in the research.

Permission to Take Part in a Human Research Study

Your signature below indicates your permission for the child named below to take part in this research.

DO NOT SIGN THIS FORM AFTER THE IRB EXPIRATION DATE BELOW

Name of participant

Signature of first parent or guardian

Date

❑ Parent
❑ Guardian (See note below)

Printed name of first parent or guardian

Signature of second parent

Date

Printed name of second parent

If signature of second parent not obtained, indicate why: (select one)

- ❑ **IRB determined that the permission of one parent is sufficient**
- ❑ Second parent is deceased
- ❑ Second parent is unknown
- ❑ Second parent is incompetent
- ❑ Second parent is not reasonably available
- ❑ Only one parent has legal responsibility for the care and custody of the child

Assent

- ❑ Obtained
- ❑ Not obtained because: ***[NOTE: REMOVE ALL OPTIONS NOT APPROVED BY THE IRB]***
  - ❑ IRB determined that assent of the child was not a requirement
  - ❑ The capability of the child is so limited that the child cannot reasonably be consulted.

Signature and Printed name of person obtaining consent and assent

My signature and date indicates that the information in the consent document and any other written information was accurately explained to, and apparently understood by, the participant or the participant's legally authorized representative, and that informed consent was freely given by the participant or the legally authorized representative.
Note on permission by guardians: An individual may provide permission for a child only if that individual can provide a written document indicating that he or she is legally authorized to consent to the child's general medical care. Attach the documentation to the signed document.

APPENDIX J: INFORMED CONSENT TEACHER

An Examination of Movement in Preschool and Kindergarten Classrooms for Young Children with Disabilities

Informed Consent

Principal Investigator: *Faith Ezekiel-Wilder, Doctoral Candidate*

Co-Investigator(s): *Lisa Dieker, PhD*

Faculty Advisor: *Lisa Dieker, PhD*

Investigational Site(s): *Head Start Preschool & Title One Kindergarten*
Orange County, FL.

Introduction: Researchers at the University of Central Florida (UCF) study many topics. To do this we need the help of people who agree to take part in a research study. You are being asked to allow your child to take part in a research study which will include about 30 students and 10 teachers in different Head Start preschools and Title One Kindergartens. You have been asked to take part in this research study because you are a teacher in either a Head Start preschool classroom for children ages 3-4 or a Title One kindergarten classroom for children ages 5-6. You must be 18 years of age or older to be included in the research study.

The person doing this research is Faith Ezekiel-Wilder, Doctoral Candidate in the Department of Exceptional Education in the College of Child, Family and Community Sciences at UCF. Because the researcher is a graduate student she is being guided by Lisa Dieker, PhD, a UCF faculty advisor in the Department of Exceptional Education in the College of Child, Family and Community Sciences.

What you should know about a research study:

- Someone will explain this research study to you.
- A research study is something you volunteer for.
- Whether or not you take part is up to you.
- You should take part in this study only because you want to.
- You can choose not to take part in the research study.

- You can agree to take part now and later change your mind.
- Whatever you decide it will not be held against you.
- Feel free to ask all the questions you want before you decide.

Purpose of the research study: The purpose of this study is to examine and describe the differences in preschool and kindergarten classroom settings, as it pertains to movement and movement-based mathematics activities, for young children with disabilities. Through observations of classroom teachers, teacher schedules, lessons plans and interviews with the teachers the researcher will be able to identify different ways in which the teacher is integrating movement in the classroom. The purpose of identifying this information will help to provide background for creating classrooms that promote children's learning through movement and also to assist with children transitioning from preschool classrooms to kindergarten classrooms.

What you will be asked to do in the study:

All teachers in this study will be asked:

(a) To be available and have their classroom observed 5 days total during a 12 week period. Each observation will last the full school day.

(b) Complete an interview about your experience and teaching strategies. The interview should last no more than 1 ½ hours.

(c) Provide a classroom schedule to the researcher, at the beginning of the study.

(d) Provide weekly lessons plans for the total observation period (12 weeks).

(e) Complete a survey about perceptions of the importance of different teaching strategies.

Location: This research study will take place in your school and classroom. You are not required to travel else where for participation in this research study.

Time required: We expect that you will be in this research study for a total of 12 weeks. During those 12 weeks your classroom will be observed for a total of 5 days and approximately 7 hours each day.

Audio or video taping:

You will be audio taped during this study, only during the interview procedure, all other study procedures are not audio recorded. If you do not want to be audio taped, you will be able to be in the study. Discuss this with the researcher or a research team member. If you are audio taped, the tape will be kept in a locked, safe place. The tape will be erased or destroyed when all interviews have been transcribed in their entirety and the study has ended. All recordings and transcriptions will be marked with an unidentifiable mark, participants personal information will not be marked on the recordings.

Risks: There are no reasonably foreseeable risks or discomforts involved in taking part in this study.

Compensation or payment: There is no compensation, payment or extra credit for taking part in this study.

Confidentiality: We will limit your personal data collected in this study to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of UCF.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints, or think the research has hurt you, talk to:

Faith Ezekiel-Wilder, Graduate Student & Doctoral Candidate , Exceptional Education Program, College of Child, Family and Community Sciences ([redacted]r Dr. Lisa Dieker, Faculty Supervisor, Department of Exceptional Education at (407) 823-3885 or by email at lisa.dieker@ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901. You may also talk to them for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You want to get information or provide input about this research.

Withdrawing from the study:

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include if you are unavailable for more than 2 days of observations during the research study time period. The sponsor can also end the research study early. We will tell you about any new information that may affect your health, welfare or choice to stay in the research.

Your signature below indicates your permission to take part in this research.

DO NOT SIGN THIS FORM AFTER THE IRB EXPIRATION DATE BELOW

Name of participant	
Signature of participant	Date
Signature of person obtaining consent	Date
Printed name of person obtaining consent	

APPENDIX K: MEMBER CHECKING PROCEDURES AND COMMUNICATION SCRIPT

Hello <Participant/Teacher Name>,

Thank you for taking the time to sit down for our interview. Previously when we spoke, I mentioned to you that I would provide you with the transcript of our interview and give you an opportunity to review and provide additional comments.

One feature to ensure accuracy of the study is to give participants an opportunity to review interview transcripts. You will find attached to this email a full transcription for your review. **Please read through the transcript and provide any comments or additions you would like to make by using track change in the Word document.** If you do not have any additions or comments, please respond to this email with 'no changes'.

Again, thank for you time and assistance with my dissertation.

If you have any questions, please feel free to contact me.

Best,

Faith Ezekiel-Wilder
Doctoral Candidate, Exceptional Education
Project LEAD Scholar, FEF McKnight Fellow &
UCF Dean Fellow
University of Central Florida
College of Education and Human Performance
f.ezekiel.wilder@knights.ucf.edu

APPENDIX L: INTERRATER RELIABILITY PROCEDURES

Dear <Interrater>,

Thank you for assisting me with the interrater reliability for my dissertation study. The use of a peer de-briefer is one method to ensure the reliability and validity of my data analysis. I have completed the analysis for one group of teachers and attached it here.

The attached excel file include the following:

- Column A- The Case Number
- Column B- The Data Source
- Column C- Significant Statements From The Data Sources
- Column D- Researcher Assigned Summarized Category Names
- Column E- Overlapping Categories Per Data Source
- Column F- Overlapping Themes Derived from Categories
- Column G- Debriefer Notes

What I need you to do:

1. Read the information in Column C and decide if you agree with the researcher assigned category.
2. Read the overlapping themes in Column F derived from common categories and decide if you agree.
3. In Column G provide comments/feedback if you agree with overlapping themes. Feedback can include if you do/don't agree and why.

If you have any questions or comments, please let me know.

APPENDIX M: SINGULAR OR DUALLY IDENTIFIED CATEGORIES OF PRESCHOOL PRECEPTIONS EVIDENCE

Category	Explanation	Case(s)	Evidence
Independence	Teacher perceive that it's important to teach young children with DD strategies for being independent.	P1	○ P1- "I tried to make sure that they more so understand their routine" ○ P1- I love for them to be able to make choices."
Transitions	Teachers perceive that transitions between activities in the classroom are opportunities for movement for students with DD.	P1 & P2	▪ P1- My transitions. I think it helps because… I try to do… from table to rug. ▪ P2- "The way my classroom schedule works we're like down and up… I try to make it so that they're not sitting for too long in one location."
Individualized	Teachers perceive it's important to make sure work is individualized for students with DD and one-on-one instructional time can benefit them.	P2 & P3	○ P2- "They're required to go to all these centers, and we group them based on their ability and target specific skills that they need to work on." ○ P2- "When I write their IEP goals I tie all their goals into kind of into what is going on in the classroom." ○ P3- "I'm able to pull and do a lot of one-on-one time with the kids who really need the help"
Manipulatives/ Concrete Objects	Teachers perceive manipulatives and concrete objects are an effective strategy for teaching mathematics to students with DD.	P2 & P3	▪ P2- "Bingo games to hands on manipulatives." ▪ P2- "sometimes I'll draw like a ten frame on the floor with like tape and will put like manipulatives in it." ▪ P3- "I use all different strategies…a lot of the concrete objects"
Visuals	Teacher perceive That using visuals during lessons helps students with DD.	P3	○ P3- "A lot of my instructional strategies include a lot of visuals."

APPENDIX N: SINGULAR OR DUALLY IDENTIFIED CATEGORIES OF KINDERGARTEN PRECEPTIONS EVIDENCE

Category	Explanation	Case(s)	Evidence
Open-Ended Questions	Teacher perceives that open-ended questions can help students with DD learn.	K1	○ K1- I asked a lot of open-ended questions… [to] help them think about what they're doing.
Consistency	Teacher perceives that a consistent schedule is important for students with DD.	K1	▪ K1- "It keeps it consistent for them, so they know what the expectation is."
Structure	Teacher perceives that structure helps reduce confusion and helps students with DD.	K2	○ K2- "They do well with structure, cause if you don't have something planned for them you're going to have chaos. You will have chaos."
Visuals	Teachers perceive that visuals are an effective strategy for instructing students with DD.	K2 & K3	▪ K2- "We do use visuals, that's another thing." ▪ K3- "Use a lot of visual cues with basically everyone, even if [they] need or not. It kind of, at this age group, it helps."
Movement and Focus	Teachers perceive that movement is important and can help with focus for children with DD.	K1 & K3	○ K1- When asked, how does movement affect the environment of your classroom, B1 answered, "It's important. It is very important". ○ K3- "They need movement, they need to move around to really help focus"
Manipulatives	Teachers perceive manipulatives are an effective strategy for teaching mathematics to students with DD.	K1 & K2	▪ K1- "Math…with the manipulatives… we use a lot of manipulatives." ▪ K2- "With our math we have some type of manipulative that we use as well."

APPENDIX O: SINGULAR OR DUALLY IDENTIFIED CATEGORIES OF MOVEMENT AND MATHEMATICS IN PRESCHOOL CASES EVIDENCE

Category	Explanation	Case(s)	Evidence
Fine Motor	Teachers integrated activities into mathematics instruction that required students to use fine motor movements but did not include any type of manipulative.	P1 & P2	▪ P1- Students were creating caterpillars. Students used fingerprints to make different numbered segments of a caterpillar. ▪ P2- Students counted with pointer finger when directed by teacher to count objects of the pages.
Total Body Response	Teachers had students participate in mathematics activities moving entire body in response to a question.	P1 & P3	o P1- "[I have an] alligator game…it's…[a] floor game and…they roll…[a die] and then whatever the number is they have to…jump it" o P3- "We do the five little speckled frogs, [I] have them line up [along] a log and then kind of jump in the pond."
Upper Body Manipulatives	Teachers integrated activities into mathematics instruction that included manipulatives and required students to use movements from their waist up.	P1 & P2	▪ P1- "So, I'll give him the die, and I let them roll, and I let them count and their supposed to pass it to the next person." ▪ P2- Ten frame taped down on the carpet. Each student gets to put a shape in a box and then together clap the number of shapes in a box.
Upper body	Teachers integrated activities into mathematics instruction that required students to use movements from their waist up, but did not include any type of manipulatives.	P1 & P3	o P1- "Counting high, I usually have them move …like can you clap seven times for me." o P3- Teacher plays a shape video. Students are learning about ovals. Directed to make an oval with arms and when the oval comes up on the video the students clap.
Math Movement Videos	Teachers used a video during mathematics activities that directed students to preform movements in connection to mathematics subjects.	P2 & P3	▪ P2- "Jack Hartman has videos on his YouTube channel. One is like drawing numbers and exercising. So their physically taking their arms and drawing all the numbers" ▪ P3- Teacher plays a shape video. Students are learning about ovals. Directed to make an oval with arms and when the oval comes up on the video the students clap.

APPENDIX P: SINGULAR OR DUALLY IDENTIFIED CATEGORIES OF MOVEMENT IN KINDERGARTEN CASES EVIDENCE

Category	Explanation	Case(s)	Evidence
Brain Breaks	Teacher directed physical activity that does not include a video or music.	K1 & K2	▪ K1- After finishing circle time activities the teacher has the students dance and sing to head shoulders knees and toes. ▪ K2- During the interview, the teacher said, “during morning announcements after they get done with he Panther Pride, they have to do the exercises." While observing the class students participated in daily exercise movements every morning. Movements including push ups and jumping jacks.
Movement Music Videos	Teacher uses videos that include music to direct and engage students in movement.	K1 & K3	o K1- The teacher was observed play two to four movement music videos a day. Students participated in “A beaver dance” video, “Milkshake” video and “The Ants Go Marching”. o K3- Every morning after breakfast and before instructional activities. The teacher pulled up a music movement video for students to participate in. For example a Go Noodle video that had students dancing by putting thumps up, elbows back, feet apart, knees together, sway back and forth while singing.
Individuals	Teacher directs one to four students to complete an activity that requires movements but not all the students have an opportunity to engage in the movement.	K1 & K2	▪ K1- During circle time activities and mathematics whole group activities one or two students would be chosen to lead the class in instruction by pointing to numbers or sight words. But not all students had the opportunity to get up and move around as the leader. ▪ K2- The teacher would choose one student to collect pencils or hand out papers. The teacher also was observed having four students come up to the front of the room and hold weather signs during morning circle weather.
Circle time	Movement directed by the teacher, a video or song during circle time activities.	K1 & K2	o K1- During circle time, the teacher was observed directing students to clap out the date. o K2- Every morning the students were observed signing and dancing to a days of the week song. During the days of the week song, students were observed singing while sitting in chairs. They would then sing "Monday" and hold up one hand, "Tuesday" hold the other hand up, and "Wednesday" and clap hands together. This pattern continued through all the days of the week.

APPENDIX Q: SINGULAR OR DUALLY IDENTIFIED CATEGORIES OF MOVEMENT AND MATHEMATICS IN KINDERGARTEN CASES EVIDENCE

Category	Explanation	Case(s)	Evidence
Interactive Technology	Teachers integrated technology into instructional activities that required students to participate in the technology with either fine or gross motor movements.	K1	▪ K1- Teacher was quoted during the interviewing describing how she uses interactive technology during math, "And there's math activities on…[the SmartBoard], so they get to come up, and they get to interact with the board".
Math Movement Videos	Teachers used a video during mathematics activities that directed students to preform movements in connection to mathematics subjects.	K1 & K3	o K1- Count to 100 with directed movements. Marching, jumping etc. o K3- Go noodle video. Students marched to different movements while counting to 100.
Total Physical Response	Teachers integrated whole body movements in instructional activities that required students to participate through total physical responses.	K2 & K3	▪ K2- While observing the class, the K2 teacher was teaching students about the sides and vertices of a square. During a whole group mathematics lesson, the teacher taped a large square on the carpet and had students come up one by one and walk around the square. She then asked students comprehension question (i.e., can you stand on a vertices?" ▪ K3- While learning about measurements, the teacher was observed lining the students up by laying on the ground to measure the length of the classroom. ▪ K3- To learn about height the teacher was observed calling individual students to line up along the wall where he had placed a long piece of brown craft paper. The teacher drew a mark on the paper to represent their height only with their name. The teacher then asked comprehension questions such as "who is the tallest?"
Fine Motor Manipulatives	Teachers integrated movement into activities that included the use of manipulatives that required fine motor movements.	K2 & K3	o K2- While learning about shapes, the teacher was observed instructing students to create different shapes out of play dough. o K3- While learning about measurements, the teacher was observed handing out unifix cubes to measure a variety of objects at the table.

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