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Perspectives on Motor Skills Necessary for Kindergarteners' Formal School Readiness

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Abstract

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by

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Dissertation Submitted in Partial Fulfillment

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Abstract

Researchers have noted that before children can learn academics, they must first have developed motor skills. Motor skills are foundational to learning and integrated into other domains of learning as a child develops. The problem addressed through this basic qualitative study is that some kindergarten students in the northeastern United States lack motor skills necessary for formal school readiness, and kindergarten teachers are challenged to support students' development of motor skills necessary for formal school readiness. The purpose of this study was to explore kindergarten teacher perspectives on kindergarten students' motor skills necessary for formal school readiness. Thelen's dynamic systems theory formed the conceptual framework that guided this study. The research questions focused on teacher perceptions of kindergarten teachers' perspectives about student motor skills and recommendations from teachers to strengthen students' motor skill development. Semistructured interviews captured the insights of 13 kindergarten teachers who were purposefully selected. Emergent themes were identified through open coding, and the findings were developed and checked for trustworthiness through member checking, rich descriptions, and researcher reflexivity. The findings revealed that teachers recognized the need for peer collaboration and classroom preparation to improve student classroom experiences. Implications for positive social change include the potential to foster kindergarten teachers' knowledge, skills, and understanding of what is needed to strengthen students' motor skill development necessary for formal school readiness.

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Dedication

This dissertation is dedicated to my loved ones; my family, my friends and my colleagues for their endless support, encouraging words, and understanding when I missed out on events in order to prioritize this studying and writing process. Yes Addy, this means I will be able to go on vacation, keep my computer closed, and not have to "go do work" from here on out. Thank you Addy for understanding- may you always shoot for the stars and know we will support you in anything you reach for! Thank you to my mom, dad, and sister, Laurie, Brian, and Kaity- for supporting my desire to be a lifelong learner and always encouraging me to reach my biggest goals. Thank you to my grandmother Sally, for the unlimited phone calls and lending a listening ear for every step of my journey.

The biggest and most heartfelt thank you goes to my loving husband, Collin. I would not have made it through this journey without you. This process has been a whirlwind, tiresome, and frustrating at times and you remained supportive, patient with me, loving, proud, and positive. I am so lucky to have you by myside cheering me on. Thank you for helping me to achieve this lifelong dream of mine, and for stepping in for all the things when this huge undertaking kept me from participating in family and life events. I love you, and I will always be your biggest cheerleader throughout this thing called life!

To my fellow early childhood educators- thank you! Your work is relentless, and makes a bigger difference than you could ever imagine to this World.

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Chapter 1: Introduction to the Study

This study focused on what kindergarten teachers need to know to support the development of students' motor skills to increase their formal school readiness. Motor skill development in early childhood contributes to school readiness (Gonzalez et al., 2019). This study was needed because when students enter formal school with underdeveloped motor skills, they are not yet able to learn academic skills (Bay & Bay, 2020; Chandler et al., 2021; Escolano-Perez et al., 2020; Fischer et al., 2020; Greenburg et al., 2020; Katagiri et al., 2021; Klupp et al., 2021; Macdonald et al., 2020; McClelland & Cameron, 2019; Ozkur, 2020; Rechtik, 2018). Findings from this study may contribute to positive social change by fostering early childhood stakeholders' (such as teachers, administrators, curriculum writers, caregivers, and coaches) understandings of the importance of young children's motor skills and their relationship to students' readiness for formal school and academic success during kindergarten. In Chapter 1, I present the background, problem statement, and purpose of the study. I also share the conceptual framework used to create this qualitative study's research questions and methodology. I also address the significance of the study, assumptions, keywords and phrases, limitations, scope and delimitations, and conclude with a summary of the chapter.

Background

Motor skill development during early childhood is an important aspect of children's readiness for school because having motor skills ensures that children are ready for their first years of formal schooling (McClelland & Cameron, 2019). Cheung et al. (2019) suggested that motor development occurs first and the development of

cognitive skills is enhanced by motor learning. Researchers suggested that there is a close relationship between children's early motor skills and later cognitive and academic abilities (Hudson & Willoughby, 2021; Klupp et al., 2021); therefore, learning during the early years should include active learning to promote motor skill development rather than focusing solely on academics (Cheung et al., 2019). The problem that prompted this study was that, according to state data reported by the local state Department of Early Childhood, kindergarten students at the local school lacked motor skills necessary for school readiness based on their Kindergarten Readiness Assessment (KRA) data (see Table 1), and kindergarten teachers were challenged to support students' development of motor skills necessary for formal school readiness. The KRA is a nationally used, developmentally appropriate assessment that measures formal school readiness of incoming kindergarten students based on four domains: physical well-being and motor development, language and literacy, mathematics, and social foundations (Ready for Kindergarten, n.d.).

An extensive search of the relevant literature revealed that the problem of children's lack of or underdeveloped motor skills is a national issue (Bellows et al., 2017; Brian et al., 2019; Willoughby et al., 2021;) and has international concern (Barnett et al., 2019; Cook et al., 2019; Gonen et al., 2019; Nobre et al., 2018; Plumb et al., 2021; Van der Walt et al., 2020). Researchers shared how both fine and gross motor skills related to academic content areas and nonacademic areas such as social and emotional development (Chandler et al., 2021; Cheung et al., 2019; Dathe et al., 2020; Dehghan et al., 2017; Escolano-Perez et al., 2020; Fischer et al., 2020; Katagiri et al., 2021). Executive

functions and motor skills are interrelated and essential to students' success in kindergarten as the first level of formal schooling (McClelland & Cameron, 2019). Researchers have identified a gap in the literature on practice of young children's motor skills and have suggested more research is needed to understand how teachers and educators are supporting the development of children's motor skills (Alesi et al., 2021; Asakawa et al., 2019; Biediger-Friedman et al., 2019; Hamilton & Ting Liu, 2018; Hudson et al., 2020; Syakroni & Widat, 2019; Van der Walt et al., 2020). In response to the need for further research, in this basic qualitative study, I explored kindergarten teachers' perspectives on what they need to support students' development of motor skills necessary for formal school readiness.

Problem Statement

The problem addressed through this basic qualitative study is that some kindergarten students lack motor skills necessary for formal school readiness, and kindergarten teachers were challenged to support students' development of motor skills necessary for formal school readiness. This problem has been recognized locally, at state, national and international levels. At the local level, based on data collected during the 2019-2020 academic year from the local KRAs, 35.7% of entering kindergarten students scored in the *not yet evident* range for school readiness due to their underdeveloped motor skills. Data charts from the 2018-2019 academic year revealed similar information based on findings that 35% of entering kindergarten students scored in the *not yet evident* range for school readiness due to their underdeveloped motor skills.

The KRA is a nationally used developmentally appropriate assessment to measure incoming kindergarten students' formal school readiness across four domains: physical well-being and motor development, language and literacy, mathematics, and social foundations (Ready for Kindergarten, n.d.). The KRA administration window opens the first day of school and stays open for about 30 days. Kindergarten teachers, trained in using the KRA assessment, measure children's readiness skills through a multimodal approach (Ready for Kindergarten, n.d.). Teachers use a rubric to score selected response items; performance tasks performed one on one, and observations of motor activities that occur in natural settings (Ready for Kindergarten, n.d.). Kindergarten students are assessed and evaluated in the following areas: demonstrating readiness (consistently demonstrates skills and behaviors for children to participate in the kindergarten curriculum), approaching readiness (exhibits some of the foundational skills and behaviors needed to participate in the kindergarten curriculum), or emerging readiness (child displays minimal to no foundational skills and behaviors needed to participate and meet the kindergarten curriculum successfully) by the children's kindergarten teachers in settings that are known and comfortable for the students (Ready for Kindergarten, n.d.). Children whose scores classify them as "emerging" or "approaching" require differentiated instruction, interventions, and targeted support to give them an opportunity to be successful in kindergarten (Ready for Kindergarten, n.d.).

As a component of kindergarten students' formal school readiness in the state, the KRA specifically identified students' motor skill levels; and those students who scored "not yet evident" were unable to hold writing utensils, correctly use scissors properly,

and had challenges with locomotor and nonlocomotor skills (Ready for Kindergarten,nd). Due to the COVID-19 pandemic, kindergarten students in the local location did not complete the KRA for the 2020-2021 academic year as they were attending school virtually (see Table 1). KRA motor skill data for many students in the local school reflect that their readiness for formal school is "not yet evident" (see Table 1). This data highlights the problem that will be addressed by this basic qualitative study.

Table 1

Students With "Not Yet Evident" Motor Development Skills at Beginning of Year According to Kindergarten Readiness Assessment

Level	School year				
	2017–2018	2018–2019	2019–2020	2020–2021 [a]	2021–2022
Local school	32%	35%	35.7%	N/A	86.7%
School district	29%	28.6%	29%	N/A	51.3%
Schools in state	18%	20%	20%	N/A	N/A [b]

[a] No data for 2020-2021 SY due to COVID-19 Pandemic.

[b] All data not yet released or retrieved from 2021-2002 SY.

In considering the national level, researchers in the field of early childhood education with a specialization in children's motor development recommended that further research is needed to explore the relationship between motor skills and kindergarten students' formal school readiness skills (Fischer et al., 2020; Gonzalez et al., 2019; Suggate et al., 2019). Fisher et al. (2020) and Suggate et al. (2019) recommended further research is needed to explore links between children's motor skill abilities and school readiness. Gonzalez et al. (2019) found that both gross and fine motor skills contributed to school readiness and suggested more research is needed from a developmental milestone perspective. The problem addressed through this basic

qualitative study is that some kindergarten students lack motor skills necessary for formal school readiness, and kindergarten teachers are challenged to support students' development of motor skills necessary for formal school readiness. This problem has been recognized at the local, state, national, and international levels.

Purpose of the Study

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. The study included both gross and fine motor development of young children and will address a gap in the literature regarding practice about how kindergarten teachers support their students' motor skill development needed for school readiness skills. Researchers have noted that additional research on both fine and gross motor skills for children during early childhood stages is needed to increase the formal school readiness of children ultimately (see Greenburg et al., 2019; Fischer et al., 2018; Dere, 2019; Hudson & Willoughby, 2021). Greenburg et al. (2019) indicated that more research was needed on exploring interactions of early fine motor development and potential interactions among child characteristics on later academic outcomes. Fisher et al. (2018) found that fine motor skills directly influence children's academics and recommended more research in greater detail about how fine motor skills relate to specific academic skills related to numeracy. Dere (2019) found that more research is needed about specific fine motor manipulative skills and their associations with children's early literacy and reading. Ozkur (2020) found that additional research on fine motor skills and large motor skill development

interventions were needed because of their possibilities to increase preschool children's motor abilities and thus improve their emergent literacy skills. Hudson and Willoughby (2021) suggested more research that explores fine motor development and criterion that are separate for boys' and girls' development because of their different rates of meeting developmental milestones at different times.

Hamilton and Ting Liu (2018), Rechtik (2018), Astikasari et al. (2021), Alesi et al. (2020), Macdonald et al. (2020), Katagiri et al. (2021), and Cheung et al. (2019) shared how additional research is needed on how to provide teachers with motor skill development lessons, what these lessons or activities might look like, and how to implement them for their students. Furthermore, Cheraghi et al. (2021) suggested structured play during early childhood education can support gross and fine motor skills development. Based on local data, there is evidence that a problem exists in kindergarten students lacking motor skills necessary for formal school readiness (see Table 1). Findings from research at the national (Bellows et al., 2017; Brian et al., 2019; Willoughby et al., 2021) and international levels (Barnett et al., 2019; Cook et al., 2019; Gonen et al., 2019; Nobre et al., 2018; Plumb et al., 2021; Van der Walt et al., 2020) suggested a gap in the literature regarding practice related to what teachers need to know to support students' development of motor skills necessary for school readiness.

Research Questions

The following research questions guided this basic qualitative study with interviews:

RQ1: What are kindergarten teachers' perspectives on students' motor skill development necessary for formal school readiness?

RQ2: What recommendations do kindergarten teachers have to strengthen the motor skill development of kindergarteners?

Conceptual Framework

Thelen's (1989) dynamic systems theory (DST) presented motor development in children and its complexities. DST is a motor development theory that suggested motoric learning and movement are produced because of the interactions of multiple subsystems within the person, the task, and the environment (Thelen, 1989). Thelen was the first to explore human motor development involving non-linear systems unique to each individual (Rudd, 2021). According to Thelen, how children learn to control their bodies includes developmental changes in how the child is involved in self-organization and management of their body in space. DST considers the interactive roles of perception, action, and cognition. DST further identified the importance of exploration as the child developed new behaviors related to increased skills of perception, action, and cognition (Thelen, 1989).

The conceptual framework based on DST informed my research problem that some kindergarten students lack motor skills, and teachers are challenged to support students' development of motor skills necessary for formal school readiness identified at the local level and beyond (see Barnett et al., 2019; Bellows et al., 2017; Brian et al., 2019; Cook et al., 2019; Gonen et al., 2019; Nobre et al., 2018; Plumb et al., 2021; Van der Walt et al., 2020; Willoughby et al., 2021). DST also frames the purpose of this basic

qualitative study by exploring kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. The DST concepts of perception, action, cognition, and exploration as the child learns motorically and develops motor skills informed my creation of relevant research questions and subsequent interview questions. Interview questions addressed the two research questions by exploring kindergarten teachers' perspectives on kindergarten students' motor skill development necessary for formal school readiness and what they recommend to strengthen motor skill development in kindergarteners necessary for formal school readiness (see Appendix C). My approach to the inquiry was basic qualitative study with interviews with 13 kindergarten teachers across the eastern region of the United States where I am not employed or known by other kindergarten teachers. The DST was used to guide my development of the research questions, the choice of methodology, the data collection methods, and the data analysis processes. The conceptual framework will be further elaborated upon in Chapter 2 of this proposal.

Nature of the Study

A basic qualitative research methodology design was used to address the problem and purpose of the study by exploring kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. Formal school readiness is related to the physical, cognitive, social, emotional, and language domains of learning that children should have before starting formal school, which begins with kindergarten

in most states in the United States (Bay & Bay, 2020; Rechtik, 2018). It includes the skills necessary for adaptation and success when children have matured emotionally, socially, physically, and cognitively and are ready for school (Bay & Bay, 2020, Rechtik, 2018). Although readiness includes all domains of learning, this study addressed a gap in the literature regarding practice related to what teachers need to know to support students' development of motor skills necessary for school readiness. Researchers have found that when students enter school with underdeveloped motor skills, they are not yet able to learn academic skills (Bay & Bay, 2020; Chandler et al., 2021; Escolano-Perez et al., 2020; Fischer et al., 2020; Greenburg et al., 2020; Katagiri et al., 2021; Klupp et al., 2021; Macdonald et al., 2020; McClelland and Cameron, 2019; Ozkur, 2020; Rechtik, 2018).

Basic qualitative methodology was my choice for this study because, according to Burkholder et al. (2020), qualitative research occurs in natural settings to describe phenomena experienced by individuals or groups; incorporate participants' voices into findings; and collect data as words, pictures, or visuals. I used qualitative interviews because they are a well known and accepted form of data collection. Burkholder et al. suggested that interviews can provide rich information from study participants' responses. These could include a text of participants' responses, the tone and inflection of their voices, and body language (Burkholder et al., 2020). I followed an interview protocol to address the two research questions of this basic qualitative study. The protocol was reviewed and validated by an expert in young children's motor skill

development and what teachers need to know and understand to support the development of kindergarteners' motor skills necessary for formal school readiness.

Definitions

Fine motor skills (FMS): Fine motor skills represent a skill set that includes hand-eye coordination, visuomotor skills, graphomotor skills, and even handwriting (Suggate et al., 2019). More specifically, FMS are small muscle movements that require control and eye-hand coordination (Gonzalez et al., 2019; Suggate et al., 2019), such as grasping, object manipulation, or drawing (Gonzalez et al., 2019).

Gross motor skills: Gross motor skills represent a skill set that requires whole body movement, using your core muscles and arm and leg muscles for skills like sitting, walking, balancing, running, and so forth. (Gonzalez et al., 2019).

Motor development: Motor development is an essential part of cognitive development; to develop the mind and brain, the body must also develop (Escolano-Perez, 2020). Motor development also includes both gross motor skills (large muscle movements such as sitting independently) and fine motor skills (small muscle movement such as writing; Gonzalez et al., 2019). Both gross and fine motor skills are fundamental for school functioning, especially as fine motor skills are so heavily used, developed, and needed in pre-academic and early childhood classrooms for daily tasks like gripping writing and coloring utensils, paper and material handling, and symbol recognition (McClelland & Cameron, 2019).

Fundamental motor skills (FDMS): FDMS are the basic and most common movements associated with physical movement and activities like walking, running, jumping, skipping, throwing, and catching (Bellows et al., 2017).

Kindergarten Readiness Assessment (KRA): KRA is a national developmentally appropriate assessment used to measure the school readiness of all incoming kindergarten students starting the first day of school and lasting until mid-October (Ready for Kindergarten, n.d.). It is a research-based, valid, and reliable assessment that measures four domains: physical well-being and motor development, language and literacy, mathematics, and social foundations (Ready for Kindergarten, n.d.). It is a mix of naturally occurring setting observations and groups scored on a specific rubric and criteria, selected response items, and performance tasks completed one on one with the teacher (Ready for Kindergarten, n.d.). The goal of the KRA is to measure each student holistically as they enter kindergarten on their school readiness to best meet all the student's individual needs.

School readiness: School readiness refers to the physical, cognitive, social, emotional, and language domains of learning that child should have before starting formal school (Bay & Bay, 2020, Rechtik, 2018). School readiness also includes the skills necessary for adaptation and success, showing the child has matured emotionally, socially, physically, and cognitively and is ready for formal school (Bay & Bay, 2020, Rechtik, 2018).

Title I school: Title I schools are public schools with high numbers and/or high percentages of children from low-income families (United States Department of

Education, n.d.). Title I schools receive allotted federal funds to help ensure that these students still meet the challenging state academic standards across the nation and to ensure these students' and families' needs are met for the best interest of the children (United States Department of Education, n.d.).

Assumptions

In qualitative research studies, assumptions are conditions that are taken for granted, and without such assumptions, the research would be pointless (Burkholder et al., 2020). I have identified several assumptions. First, I assumed that all kindergarten teachers participating are familiar with the kindergarten curriculum, delivery of instruction, and teaching policies. Second, I assumed that all kindergarten teachers understand what motor skills are and how they directly relate to formal school readiness. Lastly, I assumed that all participating kindergarten teachers answered the questions honestly and to the best of their ability.

Scope and Delimitations

The scope of the research of this basic qualitative study with interviews was kindergarten teachers who work in Title I public schools in the Eastern United States. This basic qualitative study with interviews explored kindergarten teachers' perspectives on what they need to support students' development of motor skills necessary for formal school readiness. Excluded from this study was any teacher not teaching kindergarten students, any teacher at the researchers' local school, any teachers known by me, the researcher, and any teachers outside of the Eastern United States. Factors that were embedded into my research plan that are based on personal choices are delimitations (see

Ravitch & Carl, 2021). Due to my own personal experiences, role in early childhood education, and passion for teaching kindergarten students, I decided to focus on kindergarten teachers' perspectives on students' motor skill development necessary for formal school readiness and the recommended strategies they have for other kindergarten teachers to support students' development of motor skills. As a result of my delimitations, potential transferability was limited to kindergarten teachers who teach students in Title I public schools in the Eastern United States.

Limitations

There were two limitations to this study. The first was a challenge in finding appropriate participants for my study. I used state school report cards that reveal readiness levels of kindergarten children by district and campus and school websites within the local district to compile a pool of kindergarten teachers who met the criteria of the study. Teachers' emails are available on campus websites, so I was able to contact kindergarten teachers directly. State school report cards share the demographics, Title I qualifications, the population size, school name, and student scores across grade levels academically. Once I determined the names of three campuses where kindergarten teachers have been successful in developing kindergarten students' motor skills development needed for formal school readiness, I then accessed their public websites to find email addresses. With this information, I was able to directly contact kindergarten teachers and invite them to participate in this study. I attended Walden University's Institutional Review Board (IRB) office hours and was informed that because the websites and school directories are public domain, I could reach out to these possible

volunteers directly. Another limitation was my own bias because I am a kindergarten teacher and wanted to make sure not to include any of my own biases, preconceived notions, or opinions in this research. I did not include my local school's teachers to ensure I recruited only teachers that I have had no prior relationship with. I also kept a reflective journal in which I let out my personal thoughts and opinions throughout the process while keeping them out of the research. Research journals also known as reflective journals, are commonly used by researchers during the research process, especially during reflection and the data collection process (Annik, 2017).

Significance

This basic qualitative study with interviews was significant in that it contributed to filling the gap in the research related to practice regarding kindergarten student motor skill development and its relation to formal school readiness. Several researchers have recommended that studies are needed to understand the link between motor skill development and school readiness (Asakawa et al., 2019; Cheung et al., 2022; Dehghan et al., 2017; Gonzalez et al., 2019; Katagiri et al., 2021; Suggate et al., 2019). Suggate et al. (2019) highlighted the importance of childhood activities in early childhood classrooms for children's motor skill development, such as using manipulatives, dressing dolls, cutting, drawing, etc., because they enhance children's school readiness; further, fine motor skills contribute to students' overall readiness for school and include daily school tasks such as holding a pencil, opening and closing markers, buttoning and unbuttoning clothing, and zipping and snapping school supplies. According to Dehghan et al. (2017), there are significant associations between children's motor development

skills and school readiness, which are both linked to children's maturity. Fine motor skill development during kindergarten is linked to students' school readiness for transition to first grade (Suggate et al., 2019). Furthermore, both fine and gross motor skill development contribute to children's development of school readiness in all domains of learning during early childhood years (Gonzalez et al., 2019), especially academic skills and performance (Cheung et al., 2022). This basic qualitative study with interviews may contribute to positive social change by fostering kindergarten teachers' understanding of the importance of young children's motor skills to student readiness for formal school and academic success in kindergarten.

Summary

This basic qualitative study explored kindergarten teachers' perspectives on what they need to support students' development of motor skills necessary for formal school readiness. Thelen's (1989) DST framed this study as its conceptual framework. The two research questions explored kindergarten teachers' perspectives on students' motor skill development and what they recommend for strengthening motor skill development in kindergarteners needed for formal school readiness. Possible positive social change includes the potential to foster kindergarten teacher understanding of the importance of young children's motor skills to student readiness for formal school and academic success in kindergarten. In Chapter 2, I review relevant literature on motor skills, school readiness, and how motor skills directly relate to school readiness.

Chapter 2: Literature Review

The problem that was addressed through this basic qualitative study was that some kindergarten students lack motor skills necessary for formal school readiness, and kindergarten teachers are challenged to support students' development of motor skills necessary for formal school readiness. The study explored kindergarten teachers' perspectives on what they need to support students' development of motor skills necessary for formal school readiness. This study addressed concerns about students' lack of motor skills for formal school readiness located in a local Title I public school in the Eastern United States, as well as addressed national concerns highlighted in the literature on motor skills and school readiness. In Chapter 2, I will present a synopsis of the current literature that highlights the relevance of the problem, as well as the literature search strategy, conceptual framework, and literature review related to key variables and concepts.

Literature Search Strategy

I researched, collected, and obtained research-based information and articles from the Walden library databases and other sources, which included ProQuest, Google Scholar, Sage Journals, EBSO host, and Teacher Reference Center. Some articles were obtained directly from working with Walden University librarians. Terms used to compile the literature review for this study included the following: *fine motor skills, motor skills, early childhood, early childhood development, school readiness, kindergarten students, motor development, kindergarten students school readiness, fine motor skills effects on school readiness, fine motor skills effects on academic*

achievement, dynamic systems theory, motor development, fine motor skills related to kindergarten, developmental theories, fine motor difficulties, fine motor skills or hand skills or dexterity or fine motor development, fine motor skills in early childhood, fine motor interventions, school readiness and motor skills, and fine motor skills, early childhood education, motor skills and culture, motor skills and home environment, environmental influences on motor skills, low income motor skills, low income effects on motor skills, low income and motor skills, low income early childhood and motor skills, motor skills and low income, motor competence in early childhood, and *early childhood motor competence skills and motor skills and learning.*

Conceptual Framework

Thelen's (1989) DST was the conceptual framework for this study. This theory explores children's motor skill development and children's continual interactions in the world around them as they access and rely upon their developing skills to a successful move in space, and how developmental domains and milestones are a dynamic, continuously evolving process, and not a linear process moving in stages (Rudd et al., 2021; Thelen, 1989, 1995). In this section, Thelen's DST theory is further defined.

DST

Thelen (1989) explored motor development in children and investigated its complexities. In doing so, Thelen developed the DST, proposing that children's motor skills are produced from the interactions of multiple subsystems within the person, the task, and the environment. Thelen was the first to explore early motor development as involving nonlinear, dynamic subsystems and domains working together, which are

unique to individuals. Researchers found that the muscle synergies used for motor movements and development demonstrate that motor development is a complex, nonlinear system (Thelen et al., 1987).

Thelen's DST is a contemporary theory in the belief that development and all domains are a dynamic and continuous cycle, rather than relying on meeting stages in a certain order (Thelen 1995, 2005). Early beliefs about motor development were driven by nature versus nurture and then evolved into information processing theory, which was focused on a more cognitive approach to explaining where and how children learned movement skills (Rudd et al., 2021). Then came along this contemporary theory, Thelen's DST explaining that motor development is dynamic and entangled with the major domains of development: physical, cognitive, linguistic, and social-emotional (Rudd et al., 2021). DST "views human movements as a highly intricate network of co-dependent subsystems that are comprised of a large number of interacting complex components" (Rudd et al., 2021, p. 9). Motor learning is a continuous process of shifting between ecological information and the intrinsic dynamics of each individual (Rudd et al., 2021). Researchers further explained Thelen's theory in that motor abilities are not separate from perceptual or functional skill development but are entangled throughout and learned and built upon together (Rudd et al., 2021). Children learn how to control their bodies, including developmental changes in how the child is involved in self-organizing, by using/her roles of perception, action, cognition, and "exploration and selection in the emergence of new behavior" (Thelen, 1989, p. 79). DST is a flexible,

time-dependent, emergent, and contemporary way to view behavior changes (Rudd et al., 2021; Thelen, 2005).

DST helps explain the phenomenon and concept of how and why school readiness and academia are correlated with motor skills by explaining that they are co-dependent domains and that they are entangled with one another (Rudd et al., 2021). This highlights the relationships between the motor skill domains (gross and fine) to cognitive and academic domains that are further explored and reviewed in this literature review section. Thelen et al. (1987) also shared that more research is needed on motor development.

Research Using DST

A number of studies that applied Thelen's (1989, 1995) DST were directly related to children's motor skill development (Alesi et al., 2021; McClelland & Cameron, 2019). McClelland and Cameron (2019) examined children's executive functioning and motor skill development in relation to school readiness. These researchers explored the link between prekindergarten children's motor skills in the context of their transition to kindergarten (McClelland & Cameron, 2019). By applying DST as their theoretical framework, the researchers found that the children in their study had motor skill development could be described as interactive, bidirectional, and multilevel (McClelland & Cameron, 2019). Alesi et al. (2021) also explored DST focusing on children's physical activity and cognitive development. Researchers found that strengthening the connection between children's physical development and their cognitive, social, emotional, and language development is needed (Alesi et al., 2021). Alesi et al. recommended further studies are needed that look at academic and nonacademic skills by applying DST.

The conceptual framework based on Thelen's (1989, 1995) DST guided my study by informing my research problem. Thelen's DST explored children's motor skill development and how it is entangled in all developmental domains—physical, cognitive, linguistic, social, and emotional. The theory looked at the roles of perception, action, cognition, and exploration (Thelen, 2005). Thelen's DST highlighted the concept of how and why school readiness and academia are correlated within motor skill development by explaining that they are co-dependent domains and that they are entangled with one another (Rudd et al., 2021). The DST informed my research questions, which explored teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness.

Literature Review Related to Key Concepts and Variable

In this section, I present relevant research that relates to fundamental motor skill development during early childhood. This exhaustive review of current literature will establish the importance of motor development skills during early childhood and their relationships to children's readiness for school. Ultimately, I addressed the gap in the literature regarding practice related to what teachers need to know to support students' development of motor skills necessary for school readiness. Specific literature on current research-based motor skill development and their relationships to academic skills development (including communication and language skills) are reviewed. I end this section by presenting research-based motor skill interventions and practices used worldwide. These interventions seem to be a promising way to approach the gap in the literature regarding practice related to what teachers need to know to support students'

development of motor skills necessary for school readiness. Researchers have suggested the need for continued research in the areas of motor development (Alesi et al., 2021; Biediger-Friedman et al., 2019; Hudson et al., 2020; Syakroni & Widat, 2019; Van der Walt et al., 2020).

Motor Skill Development

Development and refinement of motor skills help children understand their world (Ozkur, 2020). According to Piaget (1952, as cited in Ozkur, 2020), "Motor skills lead to the successful exploration of the environment by infants, and infants construct their knowledge of the world through such behavior" (p. 95). Bellows et al. (2017) researched fundamental motor skill (FDMS) performance in low income, at-risk preschoolers and found that when preschoolers are behind in their motor skill development, these delays continue through first grade, and in some cases, delays are present throughout the primary grades. Newell (2020) investigated what makes some motor skills fundamental. This researcher found that FDMS consist of three conditions: uniqueness to the movement pattern/outcomes, the universality of the functional outcome amongst the healthy population, and the capacity to act as an antecedent influence supporting the generalization of sets of motor skills (Newell, 2020).

Adolph and Hoch (2019) explored four key infant motor development features and how they reflected psychological functions in young children from birth to 5 years old. Key findings from Adolph and Hoch's study were that motor development is embodied (i.e., action opportunities depend on the status of the body), embedded (i.e., environment creates and constrains possible actions), enculturated (i.e., cultural and

social influences affect motor skills and behaviors), and enabling (i.e., new motor skills create new opportunities for learning and motor behaviors). These researchers suggested there is a connection between very young children's motor skills and behavioral flexibility related to psychology (Adolph & Hoch, 2019).

Martins et al. (2021) examined whether preschoolers' school time movement was associated with their FDMS development and the effects of these motor skills on their sedentary behavior. Researchers found that school time movement significantly predicted motor skills (Martins et al., 2021). Webster et al. (2019) explored preschool-aged children's motor skills in relation to their physical activity levels, sedentary behaviors, and exposure to screen time. The researchers found that motor skills were positively related to the children's physical activity engagement and that high exposure to screen time may have delaying effects on children's FDMS. Webster et al. suggested that additional research is needed to understand if screen time has a negative or a positive effect on children's physical development. Researchers recommend further investigation is needed that could reveal whether the problem of decreased FDMS is related to increased screen time or if it stems from children's lack of physical activity during the time they are on various screens (Webster et al., 2019).

International Interest in Motor Skill Development

There is worldwide interest in researching children's lack of motor skill development (Chou et al., 2022; Plumb et al., 2021; Van der Walt et al., 2020). Van der Walt et al. (2020) explored the prevalence of motor skill impairment in children ages 5–7 years old enrolled in a public school in a West Coast district in South Africa. The

researchers found that motor skill difficulties are significant in these children ages 5–7 years old. After assessing 138 gross and fine motor skills using the Movement Assessment Battery for Children 2nd edition (M-ABC2), Van der Walt et al. found that 14.5% of the children demonstrated motor skills difficulties and 24.6% demonstrated significant manual dexterity difficulties. In Australia, Plumb et al. (2021) found that poor motor skills are an increasing issue even for adolescents and that 20% of children beginning school in 2018 were considered at risk with motor development skills. Plumb et al. also found that physical health and physical activity were key factors in contributing to their motor skill development. Further research is recommended on the factors causing a decrease in motor skill development, especially as it follows children through adolescence (Plumb et al., 2021). Similar to Plumb et al.'s findings with physical activity and health relating to motor skills, more recent research (Chou et al., 2022) also suggests that schools with more physical fitness activities have students who display higher levels of motor development skills, executive functioning, and academic abilities. Chou et al. (2022) examined relations between Chinese preschoolers' and kindergarteners physical and motor skills, executive functioning, and their academic skills. The researchers found that children with better motor skills had higher levels of executive functioning and gained more academic skills within the school year (Chou et al., 2022).

Super and Harkness (2020) explored the behavior of newborns in the United States and across Kenya to compare children's motor and cognitive responses to a set of tasks. Researchers found that Kenyan mothers focused mostly on motor responsiveness, and U.S. mothers focused on cognitive responses in their newborns (Super & Harkness,

2020). In other words, mothers in the United States tended to primarily focus on their infants' cognitive responses and development than their physical growth and development (Super & Harkness, 2020). Super and Harkness recommended further research by following infants through the early childhood years and continue comparing their motor and cognitive responsiveness.

Environmental and Cultural Influences

Home environments and access to opportunities and experiences influence children's motor development and skills. Armstrong-Carter et al. (2021) examined how prior and current levels of home stimulation relate to changes in fine motor skills for children ages 2–4 years old, and Valadi and Gabbard (2018) examined the possible effects of one's home environment and motor skills and affordances children ages 18–42 months. The researchers found that both the preschool age period and younger (18–42 months old) is an important window of time when physically and cognitively stimulating experiences at home directly relate to the children's motor development/skills (Armstrong-Carter et al., 2021; Valadi & Gabbard, 2018). In greater detail, the availability of space for movement was a predictor of gross motor skills, and the availability of fine motor toys was a predictor of fine motor skills, and those that had access to this space and fine motor stimulating toys had greater motor skill development later on (Valadi & Gabbard, 2018). Those with low socioeconomic status were more likely to have less developed motor skills (Valadi & Gabbard, 2018). Future research is recommended in measuring fine motor skill variability as this study solely looked at holding a pencil and drawing; they recommended studying other fine motor skill abilities

like cutting with scissors, buttoning, and unbuttoning (Armstrong-Carter et al., 2021). Escolano-Perez et al. (2021) examined the influence of early environmental variables (delivery mode, feeding type) and some biological variables (sex, age) on preschool motor skills. The researchers found that males outperformed female children on throwing, while the opposite occurred when measuring fine motor skills, and females outperformed the males (Escolano-Perez et al., 2021). The research also found that children born via vaginal delivery outperformed those children delivered via c-section in gross and fine motor skill development, and those exclusively breastfed outperformed formula fed (Escolano-Perez et al., 2021).

Languages spoken at home and in the children's most common environment, can also effect children's motor skills. Barnett et al. (2019) found that language spoken at home can have an effect on children's movement and motor skills. Barnett et al. explored fundamental movement skills of culturally and linguistically diverse children by splitting them into groups based on the language spoken at home. Researchers found that Asian speaking children had lower object control and fine/small motor control compared to English-European children (Barnett et al., 2019). Cultural factors may affect object control in Asian-Australian children; however, no significant other locomotor skill differences were observed (Barnett et al., 2019).

Low Income Influences

Researchers have noted that the motor development of young children from families who live at or below the poverty level is noticeably behind or underdeveloped when compared to students from non-low-income schools (Bellows et al., 2017; Brian et

al., 2019). Bellows et al. (2017) explored motor skill performance of preschoolers identified as low income and at risk. These researchers found that children from low-income areas and families are behind in motor skill development and that motor development delays continue on through at least first grade (Bellows et al., 2017). Brian et al. (2019) explored motor competence levels of 3–6-year-old children living at or below the poverty level across the United States and reported children's motor competencies and developmental delays are greater than children from more affluent communities. Researchers found that approximately 77% of children from low-income homes and schools exemplified developmental delays in motor competence and that delays are a problem that needs to be addressed (Brian et al., 2019). Similarly, Nobre et al. (2018) investigated locomotor and object control skills for boys and girls and links with these students' academic performance in content areas of writing, math, and reading. Researchers were trying to determine if there was a link between how students of both genders performed on academic tasks, their level of motor skill development, and their nutritional status (Nobre et al., 2018). Like Brian et al. (2019), Nobre et al. (2018) found that both boys and girls in this socially vulnerable region demonstrated inferior performances in most motor skills, suggesting that healthy development is at risk for young children living in poverty. Brian et al. (2019) recommended future research on discovering why young children are behind in motor competence and how schools and communities can address this issue.

Cook et al. (2019) and Gonen et al. (2019) researched the relationship between executive functioning and motor skill development in young children from low-income

families. Cook et al. (2019) found that children's executive functioning was neither negatively nor positively associated with their physical activities but that some parts of executive function were positively associated with competence in using gross motor skills (Cook et al., 2019). Gonen et al. (2019) compared abilities of motor functioning between children living in the United States and children living in Turkey. Researchers found that in the United States, students' executive functioning levels predicted their fine motor development, communication, and problem-solving skills (Gonen et al., 2019). In the Turkish sample, executive function did not predict domain scores (Gonen et al., 2019). Cook et al. and Gonen et al. both recommended further research investigating and exploring the executive function and motor skills, and developmental domains in similar low-income populations.

Influence of Motor Skills on Developmental Domains

Motor skills relate and develop along the side of children's developmental domains of social, emotional, cognitive, and physical and language acquisitions. The National Association for the Education of Young Children (n.d.) have identified the following developmental domains in young children: physical, social, emotional, cognitive, and language. Motor skill development includes both gross motor skills (large muscle movements like sitting independently) and fine motor skills (small muscle movement like writing) (Gonzalez et al., 2019). Motor development goes hand in hand with the developmental domains of social, emotional, cognitive, physical development (motor skills and abilities), and communication and language skills. Primarily, motor skills are an essential part of cognitive development and are necessary for brain

development (Escolano-Perez, 2020). Motor development relates to social-emotional development as motor development is associated with a child's social skills (Dehghan et al., 2017), which influences their ability to make friends (Katagiri et al., 2021) and have positive behavioral outcomes when interacting with others (Hudson & Willoughby, 2021). Motor and cognitive skills work together with other domains of learning to develop and build language and communication skills, thus reinforcing the fundamental importance of adults (teachers, caregivers, parents) in fostering children's motor skills (Cheung et al., 2019). Finally, physical development is comprised of motor skills and development. Below I elaborate on recent research about the influence of motor skills on developmental domains.

Social-Emotional Developmental Domains

Researchers found associations with social emotional skills and competence and motor skill development (Cheung et al., 2022; Dathe et al., 2020; Dehghan et al., 2017; Hudson & Willoughby, 2021; Katagiri et al., 2021). Dehghan et al. (2017) found fine motor skills and social competence, and maturity in children are all related to one another. Specifically, fine motor skills are associated with the visual motor skills of hands (Dehghan et al., 2017). Improving fine motor skills can be used with other factors in improving one's social skills (Dehghan et al., 2017). Cheung et al. (2022) explored the relations between motor skills, socio-emotional skills and academic skills for 250 children with and 250 children without disabilities following children from birth through kindergarten entry, and also found that both fine and gross motor skills significantly contribute to socio-emotional skills in preschool and kindergarten students for both

children with and without disabilities. Dathe et al. (2020) explored fine motor, visual perception, and visual-motor skills in children before school entry. Researchers established that early fine motor difficulties in preschool often later manifest into peer problems, emotional symptoms, conduct problems, and low academic achievement through at least sixth grade (Katagiri et al., 2021). Preschool-aged children's motor skills are related to their performances of motor competence and behavior outcomes (Hudson & Willoughby, 2021).

Cognitive Developmental Domain

Cognitive developmental domains also show relations amongst motor skill development. Cheung et al. (2019) highlighted how motor and cognitive skills develop together during preschool years and how teachers can support building these skills. Researchers found that teachers can help build both motor and cognitive development through small and whole group class activities and by providing a concept rich environment (Cheung et al., 2019). Researchers found that preterm children are at increased risk for developmentally delays in fine motor skills, visual perception skills, and visual-motor skills compared to their like aged peers who were full term at birth (Dathe et al., 2020). Examples of activities that include motor movement and cognitive skills like numeracy, literacy, and or vocabulary include, numbered floor markers, bean bag activities, the snowman throw, and river jump (Cheung et al., 2019). Researchers have noted that children who have the necessary motor skills to engage in play and motor activities also have increased opportunities to develop pre-reading and pre-math skills before academic outcomes; however, children must first master motor development skills

(Cheung et al., 2019). Escolano-Perez et al. (2020) explored findings by Cheung et al. by determining which components of gross and fine motor skills assessed in the final years of early childhood education are associated with different academic competencies using Piaget's cognitive development theory – as motor development is an inseparable component of cognitive development. Preschool-aged children's motor skills are related to their performances of motor competence and cognitive development (Hudson & Willoughby, 2021). Researchers found that there is a close relation between fine motor skills and multiple aspects of intelligence in typically developing children and children with ADHD (Klupp et al., 2021). Fine motor skills serve as an indicator of cognitive skills across childhood and into early adolescence (Klupp et al., 2021). Johnson et al. (2020) took it a step further and observed brain activity in children during motor skills movements. Researchers found that these direct observations of brain activity that accompanies one motor responses in early childhood are not completely matured until after mid-childhood and that many children projected very different brain activities confirming that individual differences need to also be considered when studying motor development (Johnson et al., 2020). It is recommended that more research is obtained through observing and exploring individual differences in motor skills and brain activity (Johnson et al., 2020).

Communication and Language Domains

Motor skills align with communication and language skills in children. Chandler et al. (2021) examined how self-regulation moderates the relation between fine motor skills and early writing development. Researchers found that the relation between self-

regulation and writing was dependent on the writing task and that self-regulation and fine motor skills may compensate for one another when children perform writing tasks (Chandler et al., 2021). More specifically, the research found that higher self-regulation skills were needed for students with less fine motor skills to complete writing tasks, but that as the writing tasks' difficulty increased, higher self-regulation skills were also needed (Chandler et al., 2021). Researchers found that both gross and fine motor skills help to build and foster language development from birth through early childhood (Gonzalez et al., 2019). One of the biggest gross motor skills that links to language development is walking, which has been linked to infant and toddler vocabulary development (Gonzalez et al., 2019). Ozkur (2020) found a positive correlation between motor development skills and emergent literacy skills; however, tying language development to fine motor skill development could not be determined due to limited studies. Valla et al. (2020) investigated the relationships between fine and gross motor developments in infants (6-12 months) and then their communication skills at 24 months old. The researchers found that fine motor skills at 12 months were positively associated with communication skills at 24 months (Valla et al., 2020).

Kindergarten School Readiness

The development of children's motor skills is related to children's school readiness (Bay & Bay, 2020; Greenburg et al., 2019; McClellan & Cameron, 2019; Rechtik, 2018). McClelland and Cameron (2019) examined the role of executive functions and motor skills related to school readiness in the context of children's transition to kindergarten. These researchers found executive functions and motor skills

are fundamental learning skills that develop together and promote school readiness across cognitive and academic domains as children move through early childhood (McClelland & Cameron, 2019). Both executive function and motor skills help children transition to formal school (kindergarten and beyond), with the strongest evidence of fine motor skills in visuomotor integration in predicting both literacy and math outcomes (McClelland & Cameron, 2019). Greenburg et al. (2019) explored the importance of differential early fine motor skills measured in preschool to predict later school performance in primarily low income, ethnically diverse children. Researchers found that fine motor coordination was associated with significantly higher math outcomes across grade levels when children reached fifth grade levels after controlling for socioeconomic status (Greenburg et al., 2019). Bay and Bay (2020) explored primary school students' school readiness and analyzed it based on socio-demographic characteristics. Researchers found that a child's level of school readiness is important in achieving desired education goals (Bay & Bay, 2020). Researchers also identified several factors that influenced children's readiness for primary school, as follows: (a) readiness was significantly higher in students who went to preschool versus those who did not, (b) students who were 7-8 years old versus students who were 5-6 years old, (c) students whose mother's education was higher versus those children whose mother had a lower education level, and (d) students with a supportive and strong family (Bay & Bay, 2020). Rechtik (2018) explored the school readiness of children through research analysis of gross motor skills and found that motor skills relate to academic achievement and physical activity. The researcher found that improved development of gross motor skills was needed in kindergarten and nursery school as

results indicated that there exists a positive correlation between locomotor and manipulative skills.

Primary Grade Readiness

Several researchers have found that fine motor skill development is linked to many academic outcomes. Fine motor skills such as coordination and integrations have an association with academic competencies, specifically literacy and mathematics (Escolano-Perez et al. (2020). Researchers found that fine motor skills in kindergarten students are linked to their reading performance in grade 1; thus, research by Suggate et al. (2019) supported the idea that internalized motor processing skills are shared between fine motor skills and reading skills. Macdonald et al. (2020) examined the associations between fine and gross motor proficiency and academic performance in math and reading in children at one year of age through a cross-sectional study. Researchers found that children's fine motor integration skills were predictive of mathematics and reading abilities (Macdonald et al., 2020). Fischer et al. (2020) found a link between the development of fine motor skills and mathematical development. Dexterity, a form of fine motor skills, plays a significant role in children's finger counting, which contributes to their numerical skills development (Fischer et al., 2020).

Researchers found connections between motor development and literacy and mathematic skills. Dere (2019) investigated the early literacy skills of children and their visual motor integration. This researcher found that visual motor integration development supports children's early literacy skills in fine motor manipulative skills, print awareness, and expressive and receptive language skills (Dere, 2019). Fischer et al. (2018) explored

whether fine motor skills (FMS) link to procedural counting skills and conceptual counting knowledge. Willoughby et al. (2021) also explored the possible effects of improving motor competence skills in young children and how it affects or improves math skills. They found connections between motor skill competence and development and math skills (Fischer et al., 2018; Willoughby et al., 2021). Fischer et al. found that finger-counting procedures contribute to the association between FMS and numerical skills, including both procedural counting and conceptual counting knowledge. Willoughby et al. found that improving motor competence skills in young children may lead to improving executive functions and math-problem skills and suggests more research is conducted using experimental studies to further test this conclusion.

Greenburg et al. (2019) examined the differential importance of early fine motor skills in preschool to their later school performance, looking closely at visual-spatial integration (VSI) and fine motor coordination (FMC) in low-income, diverse children. Researchers found that those with stronger VSI skills in preschool had significantly better academic achievement on reading and math assessments, and FMC was associated with better math outcomes but was not significant in later reading outcomes (Greenburg et al., 2019).

Researchers also highlight the importance of fine motor skill development childhood activities in early childhood activities such as manipulatives, dressing dolls, using scissors, drawing, coloring, painting, zipping, buttoning, opening and closing door handles, gluing objects, lacing objects, and tying shoes in building fine motor skills and developmental readiness in children (Suggate et al., 2019).

Role of Play in Motor Skill Development

Researchers have found that play builds, supports, and helps children develop their motor skills (see Astikasari et al., 2021; Cheraghi et al., 2021; Merchan-Garcia et al., 2020). Astikasari et al. (2021) explored ways to develop both gross and fine motor skills in kindergarten students through five types of game models, including grain games, airplane games, zigzag animal games, straws and stringing games, and crawling glass games. Researchers found that those students who participated in any of the game models developed and strengthened motor skill abilities compared to kindergarten students who did not (Astikasari et al., 2021).

Similarly, Merchan-Garcia et al. (2020) explored a new therapy model to improve fine motor skills in children through the use of an arcade controller designed to stimulate the fingers, hands, and arms of children. Merchan-Garcia, et. al (2020) wanted to see if this arcade controller therapy could help improve these children's fine motor skills by exercising and improving their hand-eye coordination, finger control, handgrip, and body coordination. The researchers found that therapy with arcade controllers can improve the fine motor skills of children with intellectual disabilities (Merchan-Garcia et al., 2020).

Parental involvement and guidance in play can also support and build motor skill development in children (Cheraghi et al., 2021). Play that is supported at home by families helps to foster and develop motor development in children. Cheraghi et al. (2021) explored whether a given structured playing program with parental involvement could promote healthy motor skills in preschool children. The researchers found that after the given structured playing program, children's gross and fine motor skills increased

(Cheraghi et al., 2021). This research supports and engages the use of structured play in early childhood to support and develop motor development (Cheraghi et al., 2021).

Motor Skill Interventions

Researchers found that motor skill interventions significantly increase students' motor abilities (Alesi et al., 2021; Asakawa et al., 2019; Biediger-Friedman et al., 2019; Hamilton & Ting Liu, 2018; Hudson et al., 2020; Syakroni & Widat, 2019; Van der Walt et al., 2020). Motor skill-based interventions are a developmentally appropriate approach to fostering early childhood school readiness (Hudson et al., 2020). Van der Walt et al. (2020) investigated the key elements of current motor skill interventions for preschool children. Researchers found that there are 15 main types of intervention approaches, and individual and small group treatments with playful, child center approaches are the most successful (Van der Walt et al., 2020). Syafril et al. (2018) explored how to specifically develop fine motor skills in early childhood. There are two main methods to develop fine motor skills: providing tools and materials, directions, and opportunities for practice; and observing children to evaluate their fine motor skill development on an ongoing basis (Syafril et al., 2018). Hamilton and Ting Liu (2018) explored the effects of a motor skill intervention on both gross and fine motor skill performance in Hispanic pre-kindergarten children from low SES backgrounds. These researchers found that the treatment group significantly benefitted from the intervention program as both their gross and fine motor skill performance increased compared to their like aged peers who did not receive the treatment/intervention (Hamilton & Ting Liu, 2018). Students benefitted from having planned motor skill interventions (Hamilton & Ting Liu, 2018).

Asakawa et al. (2019) examined the effect of motor skill training on arithmetical abilities among first graders. The researchers found that the intervention group showed greater performance on an arithmetic task than the control group, thus highlighting the significance the fine motor skills intervention has on arithmetical abilities in children (Asakawa et al., 2019). Hudson et al. (2020) explored whether participating in cognitively challenging motor skill activities was related to improvements in motor skills and school readiness indicators: executive function and early numeracy skills. Researchers found that children in the treatment conditions demonstrated significant improvements in motor, executive function, and early numeracy skills compared to their peers in the control group (Hudson et al., 2020). Alesi et al. (2021) explored the relationship between motor and cognitive exercises in kindergarten children through a teacher led program. The researchers found that interventions using motor and cognitive exercises showed significant gains in preliteracy skills, linguistic comprehension, oral expression, and metacognition.

Biediger-Friedman et al. (2019) explored the influence mealtime activities have on fine motor development and skills, if any, in Head Start classrooms. The researchers found that mealtime provided an opportunity to merge concepts and include fine motor development, thus increasing students' fine motor skills (Biediger-Friedman et al., 2019). The researchers also found that some barriers to the children's abilities to build their fine motor development included breaks in the school schedule and lack of parent/home reinforcement (Biediger-Friedman et al., 2019).

Research Related Back to DST and Domains

This section will discuss recent research that applied Thelen's (1989, 1995) DST, that were directly related to children's motor skill development and their connections to the domains (Alesi et al., 2021). Alesi et al. (2021) explored DST focusing specifically on two of the domains- children's physical activity and cognitive development. Researchers found that strengthening the connection between children's physical development and their cognitive, social, emotional, and language development is needed (Alesi et al., 2021). Alesi et al. recommended further studies are needed that look at academic and nonacademic skills by applying DST.

Technological Interventions

Electronic toys and devices like smart devices can have a positive effect on children's motor skills when used correctly through play (Moon et al., 2018). Moon et al. explored the relationship between the use of smart devices like smartphones and touch screen tablets and the fine motor and language development levels (2018). The researchers found that smart devices were positively correlated with fine motor development yet negatively correlated with language development in children three years of age (Moon et al., 2018). Syakroni and Widat (2019) explored the influence that paint applications and activities may have on kindergarten students' fine motor abilities compared to those students in kindergarten who do not receive paint applications/activities. The researchers found that the kindergarten students who participated in the paint application/activities scored significantly higher on fine motor abilities versus their like aged peers who did not receive the paint applications/activities

(Syakroni & Widat, 2019). Syakroni and Widat (2019) concluded that paint applications and activities positively affect fine motor skills in early childhood.

Summary and Conclusions

In Chapter 2, I presented a review of current literature on motor skills and development, fine motor skills relations to academics and development, including communication and language skills, factors that develop/support motor skills (home environment and play), school readiness, and motor skill intervention practices. I also highlighted recent research using DST as their grounding framework and included research that directly relates to DST and the domains. I highlighted the need for further research on early childhood educators (kindergarten teachers) and perspectives on how they perceive their students' motor skills development needed for formal school readiness. I also discussed the literature search strategy that I used for motor skill development in early childhood. Based on relevant findings, I established a literature review that elaborated on my conceptual framework, motor skills and development, and key concepts. Included within the current and ongoing research on motor skill development related to school readiness are motor skill interventions and programs. Chapter 3 focuses on discussing and defining the methodology of this study, data collection details, data analysis, trustworthiness, and ethical procedures.

Chapter 3: Research Method

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. In Chapter 3, I discuss the basic qualitative research design and rationale, my role as a researcher, and the study's methodology. I present the method for the selection of study participants and the tools used for the data analysis. I also describe trustworthiness and its elements and the ethical procedures I followed throughout this study.

Research Design and Rationale

The goal of this basic qualitative study with interviews was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. I created research questions by using the conceptual framework as my guide:

RQ1: What are kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness?

RQ2: What recommendations do kindergarten teachers have to strengthen the motor skill development of kindergarteners?

I chose a basic qualitative method for this study because it allowed me the opportunity to explore kindergarten teachers' perspectives on what they need to support students' development of motor skills necessary for formal school readiness in Title I public schools located in the Eastern United States. I was able to explore motor skill

development that kindergarten students need for formal school readiness through the eyes of the kindergarten educators to answer the research questions. According to Burkholder et al. (2020), “Qualitative research is an exploratory investigation of a complex social phenomenon conducted in a natural setting through observation, description, and thematic analysis of participants’ behaviors and perspectives for the purpose of explaining and/or understanding the phenomenon” (p. 83). Further, qualitative research focuses on understanding specific situations, groups, or moments such as the concept of this study that will focus on kindergarten teachers’ perspectives on their students’ lack of motor skill development for school readiness, and kindergarten teachers are challenged to support students’ development of motor skills necessary for formal school readiness (see Rubin & Rubin, 2012). I considered using a narrative qualitative study but decided against it because narrative studies tell stories with a clear beginning, middle, and end (Burkholder et al., 2020), which my study did not have. I also considered using a case study where the purpose is to describe the interactions of a bonded unit (Burkholder et al., 2020). I decided not to use a case study, as I explored kindergarten teachers’ personal perspectives and experiences with students and their motor skill development across multiple schools and curriculums in which they do not have that bonded unit.

The central concept of this study involved kindergarten teachers and their perspectives on student motor skill development needed for formal school readiness. I conducted a basic qualitative study with interviews because in-depth qualitative interviewing entails talking to those with experiences related to the problem of interest (see Rubin and Rubin, 2012). I interviewed kindergarten teacher volunteers with two

years of experience in Title I schools located in the Eastern United States. Rubin and Rubin (2012) suggested that qualitative interviews are used to learn about the experiences, opinions, and motives of individuals being interviewed. I followed an interview protocol that contained interview questions created by me to address the research questions for the study.

In addition, as recommended by IRB, I had another qualified individual review my interview questions to ensure validity on two occasions as changes were made. An expert in kindergarten curriculum, pedagogy, and kindergarten student school readiness reviewed my interview questions and confirmed that they would answer the research questions.

While interviewing, I digitally audio recorded interviews with teachers and took notes in my reflective journal. After the interviews, I listened to the interviews several times, created transcripts, and recorded notes which I used to code my data (see Saldaña, 2016). I looked for patterns and outliers, categories, and themes in the data (see Saldaña, 2016). The qualitative methodology allowed me to explore, learn, and better understand the kindergarten teachers' perspectives about perceived motor skills necessary for school readiness. As the researcher, I documented, coded, evaluated, and analyzed all the data I obtained from participants' responses to the interview questions.

Role of the Researcher

As the researcher, I was responsible for all aspects of this study. I conducted and analyzed the research data as the sole researcher in this basic qualitative study with interviews. I am currently a kindergarten teacher in a Title I public school where

members of my grade level team and I recognized the problem that some students lack motor skill development necessary for formal school readiness, and kindergarten teachers are challenged to support students' development of motor skills necessary for formal school readiness. As a kindergarten teacher working with students who have underdeveloped motor skills, I felt compelled to explore this topic further. An extensive review of the literature on practice indicated that this local problem has also been recognized in young children entering kindergarten nationally. I have been in early childhood education for more than 12 years, and a public-school kindergarten teacher for 5 years now. I was immediately able to establish rapport and build a relationship with the interviewees. Building a rapport in qualitative interview studies allows the participants to feel a level of trust and respect and, in turn, share honest information (Burkholder et al., 2020). My research questions were guided by the conceptual framework of this study. This study contributes to positive social change by creating awareness and a greater understanding of this concept.

My background in early childhood education and my current role as a kindergarten teacher may have produced biases in this study. In an effort to minimize these biases, I made a conscious effort to disregard my personal experiences and beliefs and used a journal. The journal allowed me to reflect on my biases and gave me an outlet to share my thoughts, beliefs, and personal experiences through my written comments (see Ravitch & Carl, 2016). Ravitch and Carl (2016) explained how journal writing informs the researcher of their own self biases and the influence they may have on the

outcomes. The journal allowed me to identify my biases to ensure they did not interfere with the research in this study.

Methodology

A basic qualitative study with interviews was the best methodological approach to use for this study. A qualitative study is descriptive, and data is collected through words, pictures or other kinds of visual artifacts; participants' voices are included in the findings, and they describe a phenomenon experienced by a group or individuals (Burkholder et al., 2020). This methodology allowed me to explore how teachers perceive kindergarten students' motor skill development needed for school readiness. It also gave insight into their perspectives of what they need in order to develop students' motor skills development needed for school readiness in great depth.

Participant Selection

The population of the participants included current kindergarten teachers in Title I public schools within the Eastern United States, including the following: home-room teachers, special areas teachers (i.e., art, music, physical education, English as a Second Language, special education), and guidance counselors.

After consulting with the IRB about participant selection options, I used purposeful sampling to select volunteer participants who responded to recruitment through emails and snowballing. Participants were selected by using state school report cards and school websites to collect qualifying teacher emails to contact directly. State school report cards share the demographics, the population size, school name, and student scores across grade levels academically. Once I retrieved the school's names, I then had

access to their public websites and school directories, through which I was able to contact their kindergarten teachers. I attended Walden University IRB office hours and was informed that because the websites and school directories are public domain, I could reach out to those possible participants directly. I conducted semistructured interviews with participants who met the criteria and gave consent to participate via Zoom or telephone. Interviews lasted between 45 and 60 minutes and were digitally audio recorded. I had an early childhood education field expert review the interview questions and protocols to help ensure credibility and validity.

The number of participants was 13 kindergarten teachers, which was a sufficient sample size to reach data saturation. In qualitative research studies, there is no magic number of participants needed; instead, data saturation must be met through data that reaches and exemplifies no new information, and no new unexplained phenomena are discovered (Burkholder et al., 2020). I reached this data saturation through analyzing and synthesizing the data obtained from my interviews and interviewees, as well as by creating and using audit trails. I recognized data saturation as the researcher as I legitimated my study by ensuring dependability, credibility, transferability, and confirmability (Burkholder et al., 2020).

Instrumentation

For data collection in this study, I used semistructured researcher-designed interviews. I began each interview with the same scripted prompt (see Appendix A), asked the same interview questions and prompts in the same order to all participants (see Appendix B), and took written notes throughout the interviews. Participants' responses

all differed slightly, which led to further questioning and prompting of which were then written down and included in my notes. I also recorded my interviews with the participants' permission to use for further analysis of the data after it was collected. I used a self-designed list of interview questions following a responsive interview model. I have included an alignment chart in Appendix C that compares the guiding research questions that grounded this research and the conceptual framework to the interview research questions that were used.

Procedures for Recruitment, Participation, and Data Collection

For my qualitative study with interviews, I followed specific procedures for recruitment, participation, and data collection, which I explain in depth in this section.

Recruitment

First, I gained approval from IRB before I could begin the recruitment process. Then I used the public school state report cards to identify public Title I elementary schools in the Eastern United States. Finally, after obtaining teacher emails from the schools' websites, I sent recruitment emails inviting teachers to participate in my study. The IRB shared that since this is public information, accessible to anyone who searches, I could directly email my recruitment letter. I then used snowballing as needed which greatly helped me gain participants. I ensured that my recruitment invitation message clearly explained this research study criterion: seeking teachers of kindergarten students in Title I public schools located in the Eastern United States. After I was contacted back by potentially interested participants, I responded promptly and professionally with an informed consent form that explained my study further. In my response, I also included

the intent of the study, the participant's privacy protection, a clear reminder that they may opt out at any time, and my contact information as well as that of the university for any additional questions or comments. When I received consent, I arranged interview dates and times and was sure to send out a reminder one day before the planned interview and on the planned interview date.

Participation

The first 13 teachers who gave consent and met the criteria were selected to participate. There were a few criteria for volunteers to participate in this study. First, the volunteer had to be a current teacher of kindergarten students. Second, the kindergarten teacher had to be employed in a Title I public school in the Eastern United States. Third, the teacher had to have 2 or more years of experience. The IRB office confirmed for me that a written "I consent" from the participant in response to the consent form was the documented information needed. The one-time interviews lasted anywhere from 45 minutes to 60 minutes, depending on the participants' responses and prompts used. I began the interviews by closely following the script outlined in my interview protocol, thanking them for their time and participation, reminding them of the agreed-upon consent, and asking them if they had any questions. I recorded all the interviews (audio only) as well as wrote notes. Immediately following the interviews, I began transcribing the recordings while the information was still recent and fresh. After the interview, I verified the transcript with the participant for accuracy. The interview questions were open-ended, relating to the teachers' perspectives on the development of motor skills necessary for school readiness, and I used planned prompts written in hopes of gaining as

much information as possible from the participants. Participants exited the study at the end of the interview, where I thanked them again for their participation, insight, and time. There was no need for planned follow-up procedures.

Data Collection

Data from this research study were obtained through semistructured interviews with kindergarten teachers in Title I public schools. The interview protocol and questions I used are included in Appendices A and B, respectively. The interviews were audio recorded, and written notes were taken. The written field notes allowed me to take advantage of additional information, as well as write out my own thoughts, comments, and concerns to reflect back on (Annik, 2017). The recordings and written notes were transcribed and organized immediately after they were acquired (see Saldaña, 2016). I followed my scripted interview protocol, as well as order of interview questions and prompts for all interviews to help exclude any of my own possible biases, maintain consistent timing, and maintain on topic interview responses (see Rubin & Rubin, 2012). Following the data collection, I had participants review their own transcripts.

Data Analysis Plan

Data were digitally audio recorded, and I wrote handwritten anecdotal records in a reflective journal. I then listened to the recording several multiple times and transcribed the audio recordings and notes into Microsoft Word and Google Docs to have it easily accessible for coding. I used Microsoft Word to examine the interview responses conducted and coding. The data analysis steps were as follows:

1. I transcribed the data verbatim.

2. I checked each transcript by listening to the audio recordings a few times.
3. I read the written transcripts multiple times to familiarize myself with the data.
4. I wrote comments.
5. I coded by using a table that was created when collecting the data (the table is included in the final presentation of data).
6. I used the codes to find patterns and categorized the data (table is included in the final presentation of data).
7. I created a visual representation to go along with the table that highlights the patterns and categorizes derived from codes that is used in the final presentation of the data.

Saldaña (2016) explained that coding for qualitative research means to symbolically assigning a word or short phrase to capture a summary for a portion of language or even visual data. I created a table in which I included the interview transcripts, coding, patterns, categories, and themes that arose, showing transparency with my raw data. This was created during the data collection and edited continuously throughout my data analysis process. I followed a data analysis and coding process (Saldaña, 2016). First, I transcribed the data verbatim, and secondly, I checked each transcript by listening to the audio recordings a few times to ensure accuracy in the transcription. Third, I read the written transcripts multiple times to familiarize myself with the data, and then I made comments and coded by using a table that was created when collecting the data. I coded the transcripts in cycles; cycle one coded a single word

into short sentences, and cycle two coded into single words and short phrases. Finally, I used the codes to find patterns and even began to categorize the data, with my end goal of looking for data saturation amongst my codes from the interview transcripts (see Saldaña, 2016). Recognizing patterns and categories in data allowed me to organize my data and highlight patterns and outliers in my data trends, which lead me to clearly establish that I had reached data saturation from the participation (see Saldaña, 2016).

Trustworthiness

Trustworthiness refers to the confidence I had as a researcher in my sources and methods used throughout my research study to ensure the rigor of the qualitative findings (see Burkholder et al., 2020). Trustworthiness goes hand in hand with the validity and the procedures that the researcher followed to ensure their findings are accurate and thorough and relate to quality and rigor (Ravitch & Carl, 2016). Trustworthiness in qualitative research ensures that credibility, transferability, dependability, and confirmability are evident throughout the research (Burkholder et al., 2020).

Credibility

Credibility in a qualitative study means that the study's findings are believable based on the data given and shared (Burkholder et al., 2020); it is about the research's truthfulness (see Ravitch & Carl, 2021). One can build and establish credibility through various strategies such as persistent observations, peer debriefing, member checking, prolonged engagement, reflexivity, and triangulation (Burkholder et al., 2020). I am establishing credibility in my study by asking all my participants the same interview questions in the same order to help avoid bias and by using member checks in which the

participants will have the opportunity to verify their transcripts and study summary (Ravitch & Carl, 2021).

Transferability

Qualitative studies need to have meaning that goes beyond the immediate stance of the study, and transferability ensures that the researcher provides a detailed description of the setting and study assumptions so that the readers can then make their own informed generalization to a similar population of interest (Burkholder et al., 2020). I will be providing transferability all throughout the study by first creating the study's design and methodology, performing semistructured interviews and writing all inclusive interview notes, using transcripts, analyzing, and coding the data and transcript review.

Dependability

Dependability in qualitative research is essentially providing reliability. Reliability means that data collected will produce consistent/similar results in other data collection occurrences and that the tools and instruments used to obtain data will yield similar data in other data collection occurrences (Burkholder et al., 2020). If the data is reliable, the data can be constructed repeatedly if tried. However, unlike reliability, dependability cannot be estimated through statistics and instead must meet dependability. There must be evidence of consistency in the data collection, analysis, and event reporting, and if any adjustments or changes are made to the methodology that they are explained and documented (Burkholder et al., 2020). In my study, I will be supporting dependability through transcript review and triangulation of the data.

Confirmability

Confirmability in qualitative research means that if other researchers were to analyze the same data, they would essentially arrive at the same conclusions (Burkholder et al., 2020). Basically, stating that if you take the researcher out and replace them with another researcher, one will arrive at the same conclusions. I am ensuring confirmability by preventing any possible biases. I will be using a journal for notetaking, taking notes during the interview process, and keeping a log of my transcript data and coding.

Ethical Procedures

When conducting qualitative research, there were multiple necessary procedures that needed to be in practice. I had to get my research approved by Walden's IRB. I received explicit consent from each participant through an email that briefly explained the study and its goals, possible risks and benefits, my role as the researcher, an assurance that their information will be kept completely confidential, and a reminder that their participation was voluntary, and they could withdraw at any given point. The interview transcripts and notes are being kept confidential and locked in a secure password-protected thumb drive and locked file cabinet in my home office for 5 years, and then deleted and shredded per Walden University's requirements.

Summary

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. Data results were obtained through semi structured interviews with kindergarten teachers and

then analyzed to answer this study's research questions. The intent of this study was to gain a greater understanding of kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness.

The findings that came from this study have the potential to make a positive social change by bringing awareness to early childhood teachers about the need for strengthening motor skill development in kindergarten and giving them possible ideas to use to strengthen their own students' motor development. Another positive social change potential is the possibility of bringing awareness and support to kindergarten teachers working to meet individual student needs, as students' development is dynamic, non-linear, and entangled amongst all domains.

In Chapter 3, I explained the research methods and research design, my role as a researcher, methodology, and participant selection. I also briefly presented the instrumentation, recruitment procedures, and participation. Then I discussed the data collection and analysis plan, trustworthiness, and ethical procedures. In Chapters 4 and 5, I will share and describe the findings from the study and discuss the potential implications for positive social change on developing motor skills in early childhood education needed for school readiness beginning in kindergarten.

Chapter 4: Results

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. The first research question for this study was developed to explore kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness. The second research questioned examined the recommendations kindergarten teachers have to strengthen the motor skill development of kindergarteners. Chapter 4 provides and explains the setting for the study, the data collection process, the data analysis results organized by research question, evidence of trustworthiness, and a summary of the chapter.

Setting

There were no personal or organizational conditions that influenced participants or their experiences at the time the study was conducted that could have affected the study results in any way. Participants' demographics and characteristics that were relevant to the study included the following: (a) current teachers of kindergarten students with a minimum of 2 years of teaching experience, (b) currently teaching in a Title I school in the Eastern United States, and (c) participation in a video call interview. All 13 interviews were conducted via the Zoom videoconferencing platform (https://zoom.us) and were audio recorded. Participants were encouraged to participate in the interview in a private, comfortable, and safe location as the same was done by me to maintain participant confidentiality. Through remote Zoom interviews, I was able to interview

participants in a wider range of geographical locations, while also ensuring participants were proactive with COVID-19 protocols and restrictions and participated in interviews outside of school hours in an area where their confidentiality would be assured. Participants were all teachers of kindergarten students in various Title I schools in the Eastern United States including nine kindergarten classroom teachers and four specialist teachers (viz., a kindergarten physical education teacher, a kindergarten art teacher, a kindergarten reading specialist, and a kindergarten guidance counselor).

Demographics

Thirteen female kindergarten teachers volunteered and participated in this study. I assigned each participant an alphanumeric code to ensure participant confidentiality. For example, the alphanumeric code KT1 represents the first kindergarten teacher participant I interviewed. Data were organized on a first come basis. As Table 2 displays, participants ranged from kindergarten classroom teachers, a kindergarten reading specialist, a physical education kindergarten teacher, a kindergarten art teacher, and a kindergarten guidance counselor teacher all with varying years of teaching experience. Seven participants had more than 2 years but less than 10 years of experience, three participants had between 11 and 19 years of experience, and three participants had 20 or more years of teaching experience. Participants' demographic information is presented in Table 2.

Table 2

Participant Demographics

Alphanumeric code	Kindergarten position/title	Years of teaching experience
KT1	Kindergarten classroom teacher	8
RT2	Reading specialist kindergarten teacher	7
KT3	Kindergarten classroom teacher	6
PT4	Physical education kindergarten teacher	20
CT5	Guidance counselor kindergarten teacher	19
AT6	Art kindergarten teacher	5
KT7	Kindergarten classroom teacher	14
KT8	Kindergarten classroom teacher	5
KT9	Kindergarten classroom teacher	3
KT10	Kindergarten classroom teacher	20
KT11	Kindergarten classroom teacher	12
KT12	Kindergarten classroom teacher	7
KT13	Kindergarten classroom teacher	33

Data Collection

Once I received Walden University IRB approval (Approval No. 07-22-22-1012178), I began the data collection process starting with recruitment. I sent recruitment invitations via emails inviting qualified teachers to participate in my study after using the public school state report cards to identify public Title I elementary schools in the Eastern United States. Within 5 days from the date of IRB approval, I sent 182 emails to various publicly available emails of kindergarten teachers in public Title I schools in the Eastern United States. In response to the recruitment email flyer, eight eligible participants volunteered within 14 days. I then used the snowball technique with the eight volunteer

participants and gained email consent from another nine volunteers. In total, I had 17 volunteers showing interest in this study. Of the 17 volunteers, only 15 volunteers met all of the qualifications of the study (a current teacher of kindergarten students, teaching in a Title I school in the Eastern United States, and a teacher with 2 or more years of experience) and were selected to participant in the study. An informed consent document was attached to each email, and once volunteers responded with the words "I consent," the interview scheduling began. Each participant selected an interview date and time to meet their personal needs and all interviews were completed via video conferencing through Zoom. I sent a Zoom link via email to each participant. Thirteen of the 15 participants showed up for their video conference interview via Zoom, two participants were no-shows and removed from the study. Interviews were recorded via the Zoom platform and an iPhone smartphone as a safety measure in the event of a possible technical difficulty or loss of recording. Recordings were saved on a password-protected flash drive that was kept in a locked file cabinet in my home office.

The duration of data collection was 5 weeks, with interviews beginning on July 8, 2022, and ending on August 13, 2022. Each interview lasted 45–60 minutes and was audio recorded with permission from the participant. I began the interview process by explaining that participation was voluntary, and that participants could opt out at any time with no penalty. I then started the interview by following the script outlined in my interview protocol, thanking them for their time and participation, reminding them of the agreed-upon consent, and asking them if they had any questions (see Appendix A). All participants were asked the same 22 questions in the same order, followed by the prompts

as indicated in the interview questions (see Appendix B) to ensure that the same questions and information was gathered from each participant. The prompts were used as needed to give participants the opportunity to elaborate on their first responses to gather more information. In addition to staying consistent with my language and prompts, I used a reflective journal and took written field notes. The reflective journal allowed me to take personal notes during the interviews to stay objective and remain aware of my personal biases and to keep them out of the study and data collected (Ravitch & Carl, 2021). The written field notes gave me to opportunity to make note of any additional information and highlight key words/ideas (Annik, 2017).

There were no variations or unusual circumstances in data collection from the original plan that was presented in Chapter 3. Difficulty in data collection was getting enough participants to respond and commit to the study, especially given that the data collection occurred during the summer, making it more difficult to reach teachers as most teachers are 10-month employees with the summer off. With patience, persistence, determination, and the snowballing technique, I was able to secure enough qualified participants for the study.

Data Analysis

Data analysis was conducted using the following steps that were previously mentioned in my data analysis plan:

1. I transcribed the data verbatim.
2. I checked each transcript by listening to the audio recordings a few times.
3. I read the written transcripts several times to familiarize myself with the data.

4. I made comments.
5. I coded by using a table that was created when collecting the data.
6. I used the codes to find patterns and categorized the data.
7. I created a visual representation to go along with the table that highlights the patterns and categorizes derived from codes that is used in the final presentation of the data.

I used Google Docs (https://docs.google.com) to transcribe the data verbatim using the voice to text speaker option of the audio recordings, then I converted the Google Doc into a Microsoft Word document (https://www.office.com) where I organized and sorted the data. The data I collected and analyzed from the 13 interviews assured that I had achieved data saturation through the interview process. All data was collected, recorded, transcribed, analyzed, and sorted by me.

The first step of the data analysis process was to transcribe my data. I began transcribing each participant's data as I completed each interview. I transcribed each interview word for word by playing the audio recording and dictating into Google Docs using the speech to text feature. I then converted the transcribed interview data on the Google Doc into Microsoft Word. I listened to each recording multiple times for accuracy (Step 2 in my data analysis plan) and made corrections and edits as necessary for the transcription to make sure it correctly matched the interview recording word for word. I assigned alphanumeric codes to each transcript to ensure the privacy of the participants. Kindergarten classroom teachers were given the alpha code KT; the kindergarten reading specialist given RT; the kindergarten physical education teacher(s) PT; the kindergarten

guidance counselor CT; and the kindergarten art teacher AT. Each alpha code was then numbered in order of each interview completed, for example, KT1, RT2, KT3, and so forth. I ensured transcription accuracy by sending each interviewee their transcript to verify the data I had collected from them. Upon the verification from the participants about their data transcripts I then completed Step 3 in my data analysis plan, which was to read the written transcripts multiple times to really familiarize myself with the data. I then immediately began Step 4, making comments. As I continued to read the written transcripts, I made comments and was able to make notes of key words and findings I was noticing.

This led me straight to beginning to code my data (Step 5), using a table in Microsoft Word that I had created while repeatedly reviewing my data collected. In Cycle 1 of coding, I coded and looked for common single words or short phrases and patterns. This first cycle of coding resulting in 382 codes from which categories and themes began to emerge. No discrepant codes were identified. The codes were based on the conceptual framework of this study: exploring motor development in children, producing motor skills from the interactions of multiple sub systems with the person (including a task and the environment through perception, action, cognition, and/or exploration; see Appendix C). I used the "find" option in Microsoft Word to search common words I had noticed to find and then highlight the codes and how many times they were used across all data collected. For example, words "activity/activities" were mentioned 136 times by teachers, the word "skill(s)" was mentioned 211 times by teachers, "manipulatives" was said 51

times, “observe” was said 89 times, “play” was said 160 times, “move/movements” was said 42 times.

Repeated codes and phrases are considered patterns (Saldaña, 2016). In Cycle 2 of coding, I collapsed the 382 repeated codes into 65 specific patterns and categories that had been revealed (see Appendix D). The 65 specific categories and patterns included: use of manipulatives, encouraging more play, increased outdoor time, more hand on learning, never using/holding scissors before, use of observations and anecdotal notes, using playdoh for finger and hand movement, lack of social emotional skills, and more (see Appendix D). Finally, once I completed a horizontal chart for each interview question, I then collapsed the patterns and categories into themes, and put together the most frequently used codes for each of the research questions. Using this organized data, I was then able to identify themes and answers to each research question using my synthesis of the data where six themes emerged.

Lastly, in Step 7 of data analysis, I created a visual representation table that highlights the patterns and categories derived from the codes (see Table 3). This table helped me to easily identify six themes from the categories that were derived.

Table 3

Categories and Patterns That Immerged

Categories	Patterns	Codes based on common words and phrases
1. Teachers use formal & informal assessments; systematic evaluations	KRA commonly used assessment	KRA commonly used for BOY baseline assessment
	On-going observations, use of checklists and anecdotal notes	Observations Unable to sit still (on carpet or chair) Lack of trunk stability Weak core muscles
	Weak core muscles leading to lack of trunk stability and ability to sit still or sit	More developed motor skills if attended previous schooling/childcare Taking anecdotal notes Teachers complete checklists
	Technology negatively impacting students	Too much technology/too easily accessible for children Kids are increasingly technology savvy Increasingly less and less interactions with crayons, pencils, or physical books before entering K
2. Students missed opportunities in all developmental domains	Inability to use outdoor equipment/play	Lack of/poor social and emotional skills Children not knowing how to use playground/outside equipment
	Need for increase home/family involvement	Increase home/family/parent involvement
	Poor social emotional skills	
3.Students lost experiences/inability to complete FMS tasks	Need to collaborate with professionals for intervention	Never held scissors Unable to color Unable to hold a writing tool Unable to hold/use a utensil Weak finger/hand muscles
4. Students not prepared for kindergarten	Inability to successfully use fine motor tools	Developmentally students not ready for school
	Never been exposed to use of scissors	

Categories	Patterns	Codes based on common words and phrases
5. Teachers plan for use of manipulatives and various materials – whole child activities	A variety of materials for children to use Manipulatives Various writing tools Playdough/clay to build muscles	Use of manipulatives Books/Stories Using playdough/clay for finger and hand muscle development Use of building & counting blocks Using sensory items Using tweezers to build pincher grasp Arts and craft activities Provide a variety of materials for children to use Different size tools and manipulatives Large/thick/primary pencils Pencil finger grips
6. Teachers use DAP/Active "hands-on" instructional practices	Movement Hands-on learning and practicing of tools Explicit modeling and teaching of every task followed by scaffolding of independence Repetition More time and encouragement for children to explore More time to play (indoor and outdoor) Teachers play and actively participate with students Movement	Movement in the classroom More hands-on learning Practice cutting Practice with glue/pasting Practice coloring and following lines (tracing) Build their pinch/pincher grasp Teacher led modeling for every task or activity Explicit teaching and modeling of walking in lie Explicit teaching and modeling of how to listen/follow directions Hand over hand for writing Trace/tracing/highlighting Repetitive activities and practice Acting out stories Encourage more play Outside/Outdoor time More exploration Brain/movement breaks throughout the day Encourage running Promote hoping/jumping activities outside at recess Need more time for kids to explore on their own More time for use of centers Learn through play Teachers play games with students

Note. This table displays the codes I established from the interview data and how they were collapsed into patterns, categories, and then themes. KRA = kindergarten readiness assessment; BOY = beginning of year; K = kindergarten; DAP = developmentally appropriate practices; FMS = fine motor skills.

Results/Findings

In this basic qualitative study, I addressed the problem of kindergarten students lacking motor skills necessary for formal school readiness in suburban schools located in the Eastern United States. The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. I used purposeful sampling and interviews to collect data from 13 kindergarten teachers. Follow collecting the data I identified codes, patterns, categories and themes in the data. The conceptual framework for the study was based on Thelen's DST, a motor development theory explaining motor development and its complexities in children involving non-linear systems (Thelen, 1989; see also Rudd, 2021). The findings of this study indicated the perspectives of kindergarten teachers on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness, which revealed themes that answered both RQ1 and RQ2 as follows:

A. Evaluation of students' developmental levels
B. Collaboration with others to plan engaging activities
C. Preparation of environments
D. Adoption of evidence-based practices
E. Intervention with whole-child instructional strategies
F. Implementation of learning through play

In the following sections, I will further discuss each theme with brief summaries, my analyses, and quotes from participant interview responses. Kindergarten teachers' perspectives on students' motor skill development necessary for formal school readiness fell into the following themes (RQ1):

Theme 1: Evaluation of Students' Developmental Levels

Teachers recognized the need for ongoing/systematic evaluation of students' developmental levels (gross motor, fine motor, fundamental movement) through formal (KRA) and informal (observations, anecdotal records, checklists) assessments throughout the school year. Most teachers expressed how they assess students in the beginning of the year through informal assessments like observations and checklists to simply mark each students starting point and to be able to differentiate activities and instruction to meet the students where they are focusing on the skills they need. Five teachers specifically referenced the KRA as a formal BOY assessment that not only measures academics but also measure gross and fine motor skills and student's readiness for kindergarten across all domains. Most teachers shared how students are generally not ready for kindergarten when they start school, KT3 says that her students "generally are not prepared very well … 70-80% of them cannot even identify their names in print, it feels like we're building from the ground up." KT1 shared that many students "struggle writing their name, using a pencil, cutting, identifying letters of the alphabet, identifying numbers and counting", CT5 says they are mostly lacking in social emotional skills and basic academic skills. KT8 stated,

> I've noticed that many of my students we are working with in a Title I school are not prepared for kindergarten. We do the Kindergarten Readiness Assessment and in our school at least many of our students score low on a test which includes everything from social emotional skills, motor skills, math skills, and language skill acquisition.

Teachers shared specific observational findings about the children relating to their struggles with motor skills that they observe through everyday classroom tasks. AT6 elaborated her observations stating, "Sometimes they don't have enough of the muscles in their fingers developed to hold or open something small like a string cheese. If you have trouble opening them as an adult, imagine them." Similarly, KT9 shared that when her students have weak core muscles, they are unable to even sit in their chair the right way because they struggle with trunk stability and that really affects their writing.

Theme 2: Collaboration with Others to Plan Engaging Activities

The teachers recognized the need for collaboration with others (professionals, family members) to consistently plan for strategies and engaging activities that promote students' development of motor skills. Teachers shared that they work with their colleagues and ask other special area educators such as physical therapists, occupational therapists, and physical education teachers for help and guidance in planning for engaging activities that will help their specific students' needs for the motor skill development. PT4 specifically references occupational therapy and getting a lot of ideas to help build motor skills in her students from the occupational therapist such as; using smaller golf size pencils to help students gain better control on their pencils with their

little hands, cutting a hole in a tennis ball and having students pinch the ball open and close to grab and hold their pencil (building their pincher grasp), and using small tongs to have students pick up small objects like cotton balls. KT10 refers to both physical and occupational therapy and how she collaborates with them and then they come in and work with her students who are very weak in their motor skill development to help them through hand on hand practices to complete tasks (writing, tracing, and even zippering up something).

Some participants shared the need to collaborate with others on their kindergarten team as well as other teachers in their school community about developmentally appropriate practices and activities for kindergarten students that are needed to build their motor skill development necessary for school readiness. KT13 stated,

> Not all teachers really understand how it's connected, like the foundation of their academic career and motor skills. They need to be able to write their names, letters, and numbers, and be able to cut and maneuver themselves for safety through environments. We get so far focused on academics that teachers kind of forget about the "how" things are done. Like why is Johnny not able to write his name? Maybe it's because he hasn't developed those muscles yet in his hands, so ask yourself what are you going to put into place to help build his finger and hand muscles so that he can hold and move a pencil to then write his name.

Thus, KT13 is stating that teachers of the kindergarten students need to collaborate together to help plan and engage students in appropriate activities to help foster motor skill development to see the positive effects on the academic demands like writing a

name. KT10 states that, “Motor development is such a huge part of school readiness, and it is something that has been thrown to the wayside-making it a lot of extra work for us to do.”

KT10 continued to explain that she collaborates with her grade level teammates to plan for motor skill development fostering activities to help bridge this gap her and her colleagues are finding. PT4 described some student’s lack of motor skill development as “debilitating,” the students that are really struggling with fine motor skills and even gross motor to control their bodies and sit still don’t even have access to show what they know without these developments as they cannot complete tasks or write anything to show what they know. She states this is why she often collaborates with her colleagues to plan activities to help foster their motor development skills and tools to help her students like a slant writing board, using playdough and sand writing to first build their muscles.

Theme 3: Preparation of Environments

Overall, the teachers shared their observations and findings of students amongst various environments and they recognized the need for preparation of environments (indoor, outdoor, ancillary) to support students’ motor skills. Teachers shared what they observe most often in the different environments, and how they prepare their students to be successful in the different environments. Teachers most commonly noted how they have to prepare, teach, and model students how to act and successfully maneuver in each different environment like outdoors, inside the classroom and the ancillary environments like the hallway and cafeteria.

Teachers shared how they model walking quietly in a line in their classroom and how they "practice" with their students as they noted that often times students cannot keep them hands to themselves when walking and they are unable to follow along in a line. KT9 uses songs to help her students prepare for the hallway reviewing and acting out hallway expectations. KT 12 uses various movements in the hallway to get her students from point A to point B and they foster motor development like doing the "frog hopper" or "the crab walk".

In the cafeteria, the teachers overwhelmingly observe that students are not able to open their breakfast or lunch items like the muffin bag or string cheese, and that they are unable to hold and correctly use utensils like a fork and spoon. AT6 shares that they don't always have the needed finger muscles developed to be able to open small things like string cheese on their own, and KT9 elaborates how difficult of a task it is for her students to use a butter knife to spread cream cheese or butter on their bagel. Teachers have recognized the need to prepare them for this environment and work to teach them step by step how to find the little perforated tears in most packaging and how to pinch it with both hands and tear the package open, as well as how to hold and use eating utensils.

Inside the everyday kindergarten classroom teachers most often note that more often than not students are struggling with sitting still, having a hard time successfully sitting down on the carpet and standing up, using writing utensils, and lacking general spatial awareness both of themselves (consistently bumping into others) and of their environment (tripping over chairs, bumping into tables when walking). In efforts to support their students motor skills needed for smooth transitions throughout the

classroom teachers facilitate and encourage different activities most commonly playing Simon Says, and Follow the Leader (KT1, AT6, KT7) and acting out stories and various movements by following the teacher modeling (KT1, KT3, PT4, KT11). All 13 teachers shared how they use various sensory like playdough, clay, sand, and/or paint to help students build their fine motor skills and foster independent success in tasks like using writing utensils, and self-help skills like feeding (opening food and using utensils) and dressing themselves (zippering, buttoning, Velcro).

Lastly, teachers noted how in the outdoor environment like on the playground students don't know how to use playground equipment (like the monkey bars, how to swing, or climb across the various climbing obstacles). CT5 shared how she physically plays with her students on the playground equipment in order for her to model for her students how to use the equipment, and AT6 shares she gives her students different paths and obstacles to complete on the playground. Almost all teachers shared the need for more outdoor time for the students. KT8 said "children need the outdoor time to explore," and KT11 said "outdoors they develop so much with all the ways they can move their bodies."

Kindergarten teachers' recommendations for strengthening students' motor skill development fell into the following themes (RQ2):

Theme 4: Adoption of Evidence-Based Practices

Teachers recommended adoption of evidence-based practices to strengthen the motor skill development of kindergarteners through collaborating with other professionals for intervention, as many students have never held scissors, are unable to

hold a writing tool, and are unable to hold/use a utensil. PT4 and KT13 both explicitly recommend collaborating with other professionals to add evidence-based practice interventions to best help students in kindergarten with motor skill development. KT3 recommends collaborating with colleagues and even the RTI team to implement evidence based practices for her students who are severely struggling with motor skills limiting their academic performance. KT13 shares recommendations about collaborating with her grade level teammates to develop activities that are evidence based to better foster student's motor skills such as building their hand muscles through playdough, clay, pain, sand, finger plays, and pinching small objects.

Theme 5: Intervention With Whole-Child Instructional Strategies

Teachers recommended intervention with whole-child instructional strategies that strengthen students' developmental domains (physical, social-emotional, cognitive, language) throughout the school day. KT9 stated,

> You really teach all domains and large motor skills all throughout kindergarten … I would say definitely through our writing and drawing or teaching lessons on the carpet, we are using both small and large motor skills. Because when students have those weak core muscles, and they are not able to sit in their chair the correct way because of their trunk, than that really affects their writing as well. So we really do need to focus on large motor skills as well such as doing different stretches. I've noticed a lot of students struggling, and I'm not sure whether it's from lack of moving around or not playing outside but they really need a lot of their core strength in order to complete the FMS activities.

Teachers not only recognize this need for full body movement to incorporate GMS but they recommend the use of lots of physical movement in the classroom. They recommend movement activities such as brain breaks, dance breaks, exercise and count videos, Simon Says, simple follow me directions having students hop, skip, jump, etc., encouraging races and active play outside, teachers playing games with the students, and even acting out stories.

Teachers also recommend an increase in teaching social emotional skills use stories and books, acting things out, explicating teaching and modeling how to play with others, and even using social stories about feelings and how to handle big emotions like being angry. KT8 explains that this recommendation comes from the many students she observes that enter kindergarten lacking social emotional skills.

Cognitively, teachers recommend explicit teaching and modeling, using hand over hand practices when needed, engaging activities, and use of repetition. AT6 shares how she models not only her expected classroom behavior, but also every activity and learning task, “modeling gives the children a visual and the confidence to try to complete a task”. Multiple teachers (KT1, KT7, KT9, KT10) recommend using repetition of activities and learning tasks, and repetition of the same standard/skill or learning target as the students learn through repeated exposures. Teachers recommend explicitly teaching language acquisition skills and development through sentence starters and sentence frames, using visuals and symbols for pictorial clues, labeling classroom items, asking and answering open-ended questions, and again repetition. KT10 uses play centers to sit and engage in

authentic conversations with students guiding them in language and vocabulary through verbal sentence starters and questioning. KT10 gave the example, “

> In the kitchen center I will engage with the students and led the play like ‘Hi, I am so hungry. Is there a chef or waiter I can talk to? I would love to place an order’ -- starting these conversations with them not only builds their language but builds their experiences with the real world around them through make believe play.

Theme 6: Implementation of Learning Through Play

Teachers recommended implementation of learning through play with developmentally appropriate practices, and hands-on approaches to strengthen the motor skill development of kindergarteners. Teachers recommended giving students more time for free play- both indoors and outdoors. Teachers also recommended playing with the students and actively participating in play and games with them engaging with them and teaching them about their world around them helping their social emotional and language acquisition sills. KT3 stated,

> We need to encourage going back to letting children play and explore with materials, hands on activities and working with/collaborating with peers. Children are kind of losing the ability to be a child, and I think a lot of it has to do with planning and allowing for them to explore and experiment.

CT5 shared,

> Honestly because kindergarten is so academically driven now, we don’t have the time for the developmentally appropriate activities that I would like to do. Most of

those DAP activities involve more time laying and exploring outside, because I really believe you can learn almost anything though and outdoor exploration.

Teachers spoke about using hands on activities and manipulatives over and over again. KT3 and KT10 shared that it is DAP to let the kindergarten students explore and play with materials/given manipulatives before you ask them to use them to complete a task or learning activity, as they are making sense of their world and still making connections with their environment. KT8 encourages lots of hands-on activities for the children throughout the day and all academic areas, and KT12 recommends hands on small group learning centers that the students engage in daily. KT13 recommends and encourages hands on learning through drawing lines, coloring, writing standing and even using large easels and papers and pencils because for students to develop those fine motors, they must have those gross motor skills because of the connection amongst FMS and GMS. They recommend providing a variety of manipulatives, eyedroppers, and large tongs, having various size tools, books/stories, using playdough/clay, building & counting blocks, connecting cubes, magnetic letters, sensory items, arts and crafts, various size pencils and crayons, coloring, practice cutting, and practice gluing/pasting.

Evidence of Trustworthiness

Trustworthiness is the confidence I had as a researcher in my sources and methods used throughout my research study to ensure the rigor of my qualitative findings (see Burkholder et al., 2020). Trustworthiness enhances the validity in the researchers procedures ensuring their findings are accurate and thorough that relate to quality and rigor (Ravitch & Carl, 2016).

Credibility

I established credibility in my study by following the interview protocol and by asking all my participants the same interview questions in the same order to help avoid bias (Ravitch & Carl, 2021). According to Ravitch and Carl (2021) another method to ensure credibility in trustworthiness is to give each participant the opportunity to verify their transcripts and the study summary, therefore I followed each research interview with an email including a copy of their transcripts and study summary. This gave the participants the opportunity to reply to the email with any discrepancies, concerns, or further comments.

Transferability

Transferability was provided throughout the study through the study's design and methodology, the interview protocol and semi-structured scripted interviews, descriptions of the data, themes, and procedures includes a detailed description of the setting and study assumptions. The details that are included may also help readers to better understand the study and the results. While transferability can be established through the detailed data, procedures, patterns, and reflections, it may be limited on the judgment of readers. The procedures, summaries, and conclusions from this study may potentially be sued for similar studies and comparable topics regarding school readiness in kindergarten students.

Dependability

A dependable qualitative research study means that the research finds are applicable and consistent, that they are reliable (Ravitch & Carl, 2021). Dependability

cannot be estimated through statistics and instead must meet dependability. There must be evidence of consistency in the data collection, analysis, and event reporting, and if any adjustments or changes are made to the methodology that they are explained and documented (Burkholder et al., 2020). I maintained dependability by following my scripted interview protocol and reading the same interview questions to all in the same order highlighting consistency. Then during data coding and analysis I created charts as I coded the data and found patterns. Lastly, I supported dependability through transcript reviews as I shared transcript summaries with each participant via emailing following their interview giving them the opportunity to make sure their voice was heard and captured as they intended and make any comments or revisions as needed.

Confirmability

Confirmability in qualitative research means that if other researchers were to analyze the same data, they would essentially arrive at the same conclusions (Burkholder et al., 2020); if you take the researcher out and replace them with another researcher, one will arrive at the same conclusions. I ensured confirmability after credibility, transferability, and dependability were established by preventing any possible biases. First, I kept a detailed documentation of the entire process starting with my scripted interview protocol and interview questions, followed by the interview transcripts, data interpretations, coding, themes and patterns as suggest by Ravitch and Carl (2021). My scripted interview protocols allowed me to stay consistent, and timely while I allowed participants to still lead their information shared by clarify and asking for further details to responses as needed (Saldaña, 2016). While collecting the data I used a reflective

journal for notetaking, taking notes during the interview process and recording any personal thoughts or comments I had to ensure they stayed out of my data to avoid any possible biases (Ravitch & Carl, 2021).

Summary

Participants in this study were 13 current kindergarten teachers in Title I schools with two or more years of kindergarten teaching experience in the Eastern United States. Participants answered in depth interview questions sharing their experiences and insights that pertained to students motor skills development and school readiness. The conceptual framework that guided this study was Thelen's DST. Data were collected by following an interview protocol and data were coded and analyzed to reveal patterns, categories, and emerging themes.

Findings of this study highlight the perspectives of kindergarten teachers on student motor skill development and school readiness and recommendations teachers have to promote school readiness to address two research questions. RQ1 concluded teachers recognize the need for ongoing evaluations of students' developmental levels, the need for collaboration with others to plan engaging activities, and the need for preparation of environments. RQ2 concluded that teachers recommend the adoption of evidence-based practices to strengthen motor skill development of kindergarteners as well as, interventions with whole-child instructional categories, and implementation of learning through play.

Chapter 4 gave details about the participant demographics of the study, data collection process, data analysis, a review of the study results, and evidence of

trustworthiness. In Chapter 5, I will share the interpretations of the findings, limitations of this study, implications, and recommendations for future research. Finally, in Chapter 5, I share the conclusion of this study.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. I used 22 open-ended interview questions for 13 kindergarten teachers who had 2 or more years of experience teaching kindergarteners in Title I schools located in the Eastern United States. This study had two RQs:

- RQ1: What are kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness?
- RQ2: What recommendations do kindergarten teachers have to strengthen the motor skill development of kindergarteners?

Six total themes emerged during data analysis to address both research questions. Three of the themes address RQ1 that explored kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness. Teachers recognize the needs the must know to support students' development of motor skills necessary for formal school readiness through the following: (a) recognizing the need for ongoing/systematic evaluation of students' developmental levels, (b) recognizing the need for collaboration with others to plan engaging activities, and (c) recognizing the need for preparation of environments. The final three themes addressed RQ2 that explored recommendations kindergarten teachers have to strengthen the motor skill development of kindergarteners. Teachers recommend

strengthening kindergarteners' motor skill development through the following: (a) adoption of evidence-based practices, (b) intervention with whole-child instructional strategies, and (c) implantation of learning through play. In this chapter, I present an interpretation of the findings, the limitations of this study, recommendations for further related research, and implications of this study.

Interpretation of the Findings

In this section, I explain how the findings of this study are supported by Thelen's (1989) DST. I also demonstrate how the findings of this study are supported by previous research. Six total themes emerged from the data analysis using the data collected from an interview protocol with 13 Title I kindergarten teachers across the Eastern United States. The interpretations of the findings are supported by both previous studies identified in my literature reviews, and the conceptual framework and are further explained below looking at each of the two research questions and the themes that arose.

RQ1: Themes Related to Past Literature

Research Question 1 explored kindergarten teachers' perspectives on students' motor skill development necessary for formal school readiness.

Theme 1: Evaluation of Students' Developmental Levels

The first theme to emerge in response to RQ1 was that teachers recognize the need for ongoing/systematic evaluation through assessments of students' developmental levels (gross motor, fine motor, and fundamental movement) through both formal (KRA, unit assessments) and informal (observations, anecdotal records and notes, checklists) assessments throughout the duration of the school year. Teachers must continually assess

their students to know what to plan for. This aligns with the findings of Van der Walt et al. (2020), who assessed 138 gross and fine motor skills in kindergarten-aged students (5–7 years old) to drive instruction based on where students were developmentally. Van der Walt et al. found that 14.5% of the students demonstrated motor skill difficulties overall, and 24.6% demonstrated significant fine motor skill difficulties. His findings were used to drive instruction and motor skill development interventions for these students.

Barnett et al. (2019) and Johnson et al. (2020) both shared their research conducted through extensive observations of children, demonstrating the authenticity and validity of informal observations as a form of evaluation used to assess and then appropriately plan for the needs of kindergarten aged students. More specifically, Barnett et al. explored observations of languages spoken and the effects it has on children's movement and motor skills. Using continuous, ongoing evaluations of student's developmental levels also aligns with a study by Syafril et al. (2018), who found that in order to best develop fine motor skills in early childhood one must continuously observe children to evaluate their fine motor skill development on an ongoing basis.

Theme 2: Collaboration With Others to Plan Engaging Activities

The second theme that arose was that teachers recognized the need for collaboration with others (professionals, family members) to consistently plan for strategies and engaging activities that promote students' development of motor skills. This theme is based on consistent reporting by participants regarding collaborating with others to plan engaging activities (Cheraghi et al., 2021; Cheung et al., 2019; Webster et

al., 2019) for their students that would foster motor skill development and formal school readiness. Cheraghi et al. (2021) found that students engaged in structured play in early childhood can support gross and fine motor skill development. Cheung et al. (2019) found that children who have the needed motor skills to actively engage in play and motor activities also have higher chances of developing pre-reading and pre-math skills before formal academic skills, but that children must first master motor development skills. Motor development skills can be taught, practiced, and mastered through whole body engaging activities. Webster et al. (2019) explored research about preschool-aged children's active physical activity engagement and their motor skills. These findings revealed that motor skills were positively related to children's physical activity engagement, suggesting that physical activity engagement relates to strengthened motor skills (Webster et al., 2019), supporting this theme of collaborating with others to plan for engaging activities like physical movement activities for the children.

Theme 3: Preparation of Environments

The third theme was that teachers recognized the need for preparation of environments (indoor, outdoor, ancillary) to support students' motor skills. The findings of Theme 3 were confirmed through the driving conceptual framework of this study, Thelen's DST (1989), as well as in the research of Adolph and Hoch (2019), Armstrong-Carter et al. (2021), and Valadi and Gabbard (2018).

The conceptual framework driven by Thelen's (1989) DST presented motor development in children and its complexities and suggests that motor learning and movements are produced because of multiple subsystems within the person and their

environment. The students' environment supports and fosters motor development, thus supporting the teachers recognizing the need for preparing the student's environments to support motor skills.

Furthermore, Adolph and Hoch's (2019) research confirmed that there are four key factors in developing motor development including but not limited to embedded experiences (environment create and/or constrains possible actions). Armstrong-Carter et al. (2021) and Valadi and Gabbard (2018) highlighted how physically and cognitively stimulating experiences in children's home environments directly relate to children's motor development/skills. The availability of space and opportunity for physical movement was a predictor of gross motor skills, and the availability of fine motor toys was a predictor of fine motor skill development later on (Valadi & Gabbard, 2018). It is noted that the home environment is not limited to where the child sleeps at night during their early years, but where they spend their time such as their caregivers' environment, childcare, and so forth.

RQ2: Themes Related to Past Literature

Research Question 2 explored kindergarten teachers' recommendations for strengthening students' motor sill development. The following three themes relate to the teachers' recommendations.

Theme 4: Adoption of Evidence-Based Practices

The fourth theme was that teachers recommended adoption of evidence-based practices to strengthen the motor skill development of kindergarteners specifically through developmentally appropriate practices for children 5 years old and younger

(preschool age, 3–4 years old). These findings are supported by the research of Alesi et al. (2021) and Hudson et al. (2020). Alesi et al. found that evidence-based developmental practices such as using motor and cognitive exercises in kindergarten children yielded in significant gains in preliteracy skills, linguistic comprehension, oral expressions and metacognition. Hudson et al. found that motor skill-based interventions are developmentally appropriate approaches to foster and support early childhood formal school readiness. Children who received motor skill-based interventions demonstrated significant improvements in motor, executive functions, and early math skills compared to their same aged peers who did not receive the intervention (Hudson et al., 2020).

Theme 5: Intervention With Whole-Child Instructional Strategies

The fifth theme was that teachers recommended intervention with whole-child instructional strategies that strengthen students' developmental domains (physical, social-emotional, cognitive, linguistic) throughout the school day. Whole-child instructional strategies and its benefits are supported in research to yield higher academic abilities, language skills, metacognition, and executive functioning (Alesi et al., 2021; Chou et al., 2022; Fischer et al., 2020; Plumb et al., 2021). Alesi et al. (2021) focused on exploring the relationship between motor and the cognitive developmental domain and found that interventions using motor and cognitive exercises showed significant gains in academics, language, and metacognition. The research by Chou et al. (2022), suggests that schools with more physical fitness activities have students displaying higher levels of motor development skills, academics, and executive functioning. Similarly, Plumb et al. (2021) found that physical health and physical activity are key factors in fostering and

supporting motor skill development. Fischer et al. (2020) links the development of fine motor skills and mathematical development, as dexterity plays a significant role in children's counting skills contributing their numerical skills.

Theme 6: Implementation of Learning Through Play

The final theme that arose was that teachers recommended implementation of learning through play, including hands-on approaches to strengthen the motor skill development of kindergarteners. Learning through play and the importance of play in early childhood education is supported in research by Astikasari et al. (2021), Cheraghi et al. (2021), Merchan-Garcia et al. (2020), and Van der Walt et al. (2020). Play builds, supports, and helps children to build and foster their motor skills—both gross and fine motor skills (Astikasari et al., 2021; Cheraghi et al., 2021; Merchan-Garcia et al., 2020). Astikasari et al. (2021) found that kindergarten students' gross and fine motor skills can be developed through five different types of game models through play. Cheraghi et al. (2021) also supported play in child development, specifically finding that guidance in play and parental involvement in play can support and build children's motor skill development. Merchan-Garcia et al. (2020) also found a positive correlation between play and improving fine motor skills. Merchan-Garcia used an arcade controller therapy, in which children used an arcade controller designed to stimulate the fingers, hands and arms of children (2020). Van der Walt et al. (2020) found that playful, child-centered approaches and learning through play are the most successful way to foster successful motor skill-based interventions in young children.

Limitations of the Study

This study had few limitations: finding appropriate participants, participant selections, and researcher bias. This study was limited to teachers of kindergarten students working in Title I public schools in the Eastern United States with at least 2 years of professional kindergarten teaching experience limiting the transferability to other kindergarten students amongst public schools. To ensure the participants met the above qualifications and understood the purpose of this study, I used purposeful sampling to target qualified participants. Recruitment emails were sent to 182 publicly available teacher emails of current kindergarten teachers at Title I schools in the Eastern United States. Snowballing through those participants was then used to find further possible qualified participants. The findings of this study are only representative of the perspectives of a portion of Title I kindergarten teachers located in the Eastern United States, and should not be generalized to represent all perspectives of Title I kindergarten teachers. A related limitation to consider is that these data were collected during the summer, when most teachers are not working so making contact with them through their school email was difficult. Many qualified participants responded with interest to join the study after school had started, and the data collection was already completed. Another thing to make note of is that all the participants were female, and male perspectives may differ from those of females.

Another limitation was my own bias because I am a current kindergarten teacher. I kept a reflective journal during the data collection process where I wrote my personal thoughts, and opinions that were vastly arriving during the interview process to stay

neutral and keep them out of the research. Annik (2017) supported the use of reflective journals and explains that they are commonly used throughout the research process by the researcher, especially during reflection and the data process. This allowed the participants to express their feelings, emotions, and true responses to the questions, while allowing me to feel and express my own emotions and keep them out of the research data.

Recommendations

This study was conducted to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. The topic of this study was largely based on the lack of existing research relating to students' motor skill development and their formal school readiness. The results of this study are based on the information collected from 13 kindergarten teachers (including classroom teachers, a physical education teacher, an art teacher, a reading specialist, and guidance counselor). There are several recommendations for further research supported by this study.

The first recommendation based on the findings of this study is to include a greater sample size of kindergarten teachers' perspectives from Title I public school across all regions of the United States to see whether they support or counter the findings of this study in the Eastern United States. The larger participant sample size would help to generalize the findings across Title I schools in the country. The second recommendation for additional research is to investigate specifically what whole-child instructional strategies that are developmentally appropriate practices through play and hands-on are best/most common, to foster motor skill development to better prepare

students for formal school readiness. Many participants suggested creating a list of the recommended strategies/activities/practices that could be easily followed to be used for early childhood stakeholders. Another recommendation is to investigate what more whole-child learning and play looks like in an early childhood classroom, and how it supports motor skill development. Finally, an additional recommendation is to explore interventions for motor skill development that could possibly be used by kindergarten teachers to help their struggling students.

Implications

Motor skill development, and an increase in motor skills in early childhood has significant influences on children's academic abilities, language skills and acquisition, metacognition, and executive functioning (Alesi et al., 2021; Chou et al., 2022; Fischer et al., 2020; Plumb et al., 2021). The findings of this study propose positive social change implications in Title I Eastern region kindergarten educational settings through fostering and supporting kindergarten teachers' understanding of strengthening students' motor skill development necessary for formal school readiness. Another positive social change potential is the possibility of bringing awareness and support to kindergarten teachers working to meet individual student needs, as students' development is dynamic, non-linear, and entangled amongst all domains. A final possible social change is the three recommendations this study brings to other early childhood educators to support motor skill development in their students foster formal school readiness:

- the recommendations of adopting evidence-based practices through developmentally appropriate practices

- interventions with whole-child instructional strategies to strengthen students' developmental domains
- the implementation of learning through play and hands on engagement

Conclusion

The purpose of this basic qualitative study was to explore kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness. This study was needed because the underdeveloped motor skills in formal school readiness prohibits students from having the ability to be ready to gain academic skills, which is concern both locally and nationally (Bay & Bay, 2020; Chandler et al., 2021; Escolano-Perez et al., 2020; Fischer et al., 2020; Greenburg et al., 2020; Katagiri et al., 2021; Klupp et al., 2021; Macdonald et al., 2020; McClelland & Cameron, 2019; Ozkur, 2020; Rechtik, 2018).

Thirteen participants (kindergarten teachers) were interviewed to explore their perspectives on kindergarten students' motor skills and their recommendations to strengthen their students' motor skill development. The data analysis and synthesis revealed six major themes, answering both research questions. RQ1, revealed kindergarten teachers' perspectives on students' motor skill development necessary for formal school readiness; (a) Teachers recognized the need for ongoing/systematic evaluation of students' developmental levels (gross motor, fine motor, fundamental movement) through formal (KRA) and informal (observations, anecdotal records, checklists) assessments throughout the school year. (b) Teachers recognized the need for

collaboration with others (professionals, family members) to consistently plan for strategies and engaging activities that promote students' development of motor skills. (3) Teachers recognized the need for preparation of environments (indoor, outdoor, ancillary) to support students' motor skills. RQ2, revealed kindergarten teachers' recommendations for strengthening students' motor skill development; (d) Teachers recommended adoption of evidence-based practices to strengthen the motor skill development of kindergarteners. (e) Teachers recommended intervention with whole-child instructional strategies that strengthen students' developmental domains (physical, social-emotional, cognitive, language) throughout the school day. (f) Teachers recommended implementation of learning through play to strengthen the motor skill development of kindergarteners. All of these perspectives and recommendations help to better understand what is currently happening in kindergarten classrooms regarding motor skill development, and what strategies/recommendations will help foster students motor development to better prepare them for formal school readiness.

The results of my study filled an identified gap in literature on the practice of young children's motor skills, and how teachers support/foster the development of motor skills Alesi et al., 2021; Asakawa et al., 2019; Biediger-Friedman et al., 2019; Hamilton & Ting Liu, 2018; Hudson et al., 2020; Syakroni & Widat, 2019; Van der Walt et al., 2020). Through this research, I aimed to enlighten and develop a better understanding of the connection between motor skill development and formal school readiness, and provide recommendations/strategies to early childhood education stakeholders (especially

kindergarten teachers) to support and foster motor skill development for formal school readiness throughout the United States.

Findings from this study may have the potential to contribute to positive social change by fostering early childhood stakeholders' (such as teachers, administrators, curriculum writers, caregivers, and coaches) understandings of the importance of young children's motor skills and their relationship to students' readiness for formal school and academic success during kindergarten. Findings from this study also contribute to positive social change by providing recommendations for early childhood stakeholders to implement to help foster and build students motor development to better prepare them for formal school readiness.

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Appendix A: Interview Protocol

The researcher followed a planned script for the beginning of the interviews.

Script:

Welcome and thank you so much for your participation today in this interview. I am Allyson Meegan Smith, and I am a doctoral student at Walden University. I am conducting this basic qualitative study with interviews to collect data for my study as one of the requirements for my degree. My study is exploring kindergarten teachers' perspectives on kindergarten students' motor skills and their recommendations to strengthen students' motor skill development necessary for formal school readiness.

Before we begin, let's briefly go through the informed consent form to make sure everything has been covered and that you do not have any questions. This data will be used to highlight how teachers strengthen kindergarten students' motor skill development and help early childhood stakeholders better understand the importance of motor skill development and how to support it. This interview will take approximately 45-60 minutes and will be digitally recorded to accurately document all information shared with your consent. I may also take handwritten notes during the interview. Remember that your participation is voluntary, and if you wish to take a break, stop, or withdraw from the study at any time, we will immediately do so. Withdrawing the study will not negatively affect you or have any repercussions. As the sole researcher and interviewer in this study, I can assure you that your responses and personal information will be kept confidential. I will keep my copy of the consent form password protected on a USB device in a locked file cabinet, and you are encouraged to also keep a copy of the consent form for your

personal records. Lastly, I just want to confirm one more time that you meet the criteria to participate with a few questions:

- Are you a kindergarten teacher?
- Have you taught kindergarten for at least 2 years?
- Do you teach in the Eastern region of the United States?
- Is this school a Title I school?

Do you have any questions, comments, or concerns now? With your permission, we are ready to begin the interview now, and I will begin recording.

Appendix B: Interview Questions

Today's Date:
Interview Start Time:
Interview End Time:

RQ1: What are kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness?

Interview Questions for Kindergarten Teachers:

IQ1. Please tell me about what you have observed in your students' readiness for kindergarten. Prompts: I heard you say… please give an example.
1Q2. Please tell me about how you explore students' motor skill development. Prompts: I heard you say… will you please give some examples.
IQ3.What activities do you use that could improve motor learning? Prompts: I heard you say…
IQ4. How successful are your students in engaging in motor learning after your instruction that demonstrates strengthened motor skills? Prompts: I heard you say… can you give some examples?
IQ5. How are you (as the teacher) strengthening students' motor development? Prompt: Can you elaborate on…
IQ6. How do you strengthen gross motor skill development in the classroom? Prompts: I heard you say… can you tell me more about…
IQ7. How do you strengthen small motor skill development in the classroom? Prompt
IQ8. How do you determine what skills need to be strengthened related to other academic areas that you teach? Prompts: I heard you say… Can you give some examples?
IQ9. How do you strengthen what you observe regarding your students' motor skill development and their ability to complete a task? Prompts: I heard you say… Tell me more about…
IQ10. What if any kinds of manipulatives and/or hands on learning/activities do you use to strengthen motor skills in your classroom? Prompts: Can you tell me more about…
IQ11: How do you monitor your students' motor skill development in the indoor classroom, outdoor classroom, and ancillary environments? Prompts: I heard you say… Can you give me an example…?

RQ2: What recommendations do kindergarten teachers have to strengthen the motor skill development of kindergarteners?

IQ12.What activities do you recommend that could improve student motor skill development and school readiness? Prompts: I heard you say… Can you give me an example…?
IQ13. What strategies do you recommend that engage students in motor learning and development activities? Prompts: I heard you say… Can you give me an example…?
IQ14. Tell me about your outreach with parents/guardians/families to encourage motor skill development at home. Prompts: Can you give me an example…
IQ15. What activities do you recommend that engage students in motor development activities at home? Prompts: I heard you say… Can you give me an example…?
IQ16. What activities do you recommend that can strengthen students' gross motor skill development in the classroom? Prompts: I heard you say… can you tell me more about…
IQ17. What activities do you recommend for strengthening students' fine motor skill development in the classroom? Prompts: I heard you say… can you tell me more about…
IQ18. What approaches do you recommend in determining which fundamental motor skills need to be strengthened that will result in children's abilities to perform other tasks related to academic areas that you teach? Prompts: I heard you say… Can you give some examples?
IQ19. What processes do you follow that strengthen student motor development when students are completing a task (cutting and gluing activity, writing, solving a math problem, logging into technology, etc.)? Prompts: I heard you say… Tell me more about…
IQ20. What devices, manipulatives, and/or tools for hands on learning do you recommend using to strengthen motor skills in your classroom? Prompts: I heard you say… Can you give me an example…?
IQ21: What recommendations do you suggest for observing your students' motor skill development in the indoor classroom, outdoor classroom, and ancillary environments? Prompts: I heard you say… Can you give me an example…?
IQ22: Are there any further comments that you would like to make?

Appendix C: Alignment of Questions and Conceptual Framework

<table>
<tr><th colspan="2">Perspectives on Motor Skills necessary for Formal School Readiness</th></tr>
<tr><td colspan="2">RQ1: What are kindergarten teachers' perspectives on what they need to know to support students' development of motor skills necessary for formal school readiness?
Rapport Building IQs:
IQ1. Please tell me about what you have observed in your students' readiness for kindergarten. Prompts: I heard you say… please give an example.
1Q2. Please tell me about how you explore students' motor skill development. Prompts: I heard you say… will you please give some examples.</td></tr>
<tr><th>Conceptual Framework Indicators</th><th>Interview Questions</th></tr>
<tr><td>Thelen's (1989) dynamic systems theory:
• (a) explores motor development in children</td><td>IQ3.What activities do you use that could improve motor learning? Prompts: I heard you say…
IQ4.How successful are your students in engaging in motor learning after your instruction that demonstrates strengthened motor skills? Prompts: I heard you say… can you give some examples?
IQ5. How are you (as the teacher) strengthening students' motor development? Prompt
IQ6. How do you strengthen gross motor skill development in the classroom? Prompts: I heard you say… can you tell me more about…
IQ7. How do you strengthen small motor skill development in the classroom? Prompt</td></tr>
<tr><td>• (c) motor skills are produced from the interactions of multiple subsystems within the person…</td><td>IQ8. How do you determine what skills need to be strengthened related to other academic areas that you teach? Prompts: I heard you say… Can you give some examples?</td></tr>
<tr><td>• a task (perception, action, cognition, exploration)</td><td>IQ9. How do you strengthen what you observe regarding your students' motor skill development and their ability to complete a task? Prompts: I heard you say… Tell me more about…
IQ10. What if any kinds of manipulatives and/or hands on learning/activities do you use to strengthen motor skills in your classroom? Prompts: Can you tell me more about…</td></tr>
<tr><td>• the environment (perception, action, cognition, exploration) (Thelen, 1989)</td><td>IQ11: How do you monitor your students' motor skill development in the indoor classroom, outdoor classroom, and ancillary environments? Prompts: I heard you say… Can you give me an example…?</td></tr>
</table>

RQ2: What recommendations do kindergarten teachers have to strengthen the motor skill development of kindergarteners?	
Conceptual Framework Indicates	Interview Questions
Thelen's (1989) dynamic systems theory: • (a) explores **motor development** in children • (c) motor skills are produced from the **interactions of multiple subsystems within the person…** • a **task** • **the environment** (Thelen, 1989)	IQ12.What activities do you recommend that could improve student motor skill development and school readiness? Prompts: I heard you say… Can you give me an example…? IQ13. What strategies do you recommend that engage students in motor learning and development activities? Prompts: I heard you say… Can you give me an example…? IQ14. Tell me about the outreach you do with parents/families to encourage motor skill development through play at home. Prompts: Can you give me an example… IQ15. What activities do you recommend that engage students in motor development activities at home? Prompts: I heard you say… Can you give me an example…? IQ16. What activities do you recommend that strengthen gross motor skill development in the classroom? Prompts: I heard you say… can you tell me more about… IQ17. What activities do you recommend that strengthen fine motor skill development in the classroom? Prompts: I heard you say… can you tell me more about… IQ18. What approaches do you recommend in determining which fundamental motor skills need to be strengthened that will result in children's abilities to perform other tasks related to academic areas that you teach? Prompts: I heard you say… Can you give some examples? IQ19. What processes do you follow that strengthen student motor development when students are completing a task (cutting and gluing activity, writing, solving a math problem, logging into technology, etc.)? Prompts: Elaborate IQ20. What devices, manipulatives, and/or tools for hands on learning do you recommend using to strengthen motor skills in your classroom? Prompts: Give me an example…? IQ21: What recommendations do you suggest for observing your students' motor skill development in the indoor classroom, outdoor classroom, and ancillary environments? Prompts: I heard you say… An example…? IQ22: Are there any further comments that you would like to make?

Appendix D: Second Level of Coding

A list of the 65 codes created from collapsing the first 382 codes include:

1. use of manipulatives
2. encourage more play
3. outside/outdoor time
4. movement in the classroom
5. more explore/exploration
6. more hands on learning
7. books/stories
8. practice cutting
9. never held scissors
10. practicing glue/pasting
11. using playdoh/clay for finger and hand muscle development
12. brain/movement breaks throughout the day
13. intervention for fine/small motor skills and development
14. intervention for gross/large motor skills and development
15. lack of/poor social and emotional skills
16. systematic kindergarten readiness assessment commonly used for BOY baseline assessment
17. consistently use observations over time
18. children not knowing how to use playground/equipment
19. encourage fundamental movement skills like running
20. hoping/jumping activities outside at recess
21. need more time for kids to explore on their own
22. lost opportunities - unable to color
23. practice coloring and following lines (tracing)
24. building their pinch/pincher grasp
25. unable to hold a writing tool
26. unable to hold a utensil
27. lack of trunk stability
28. unable to sit still (on carpet or chair)
29. more time for use of centers
30. teacher led modeling for every task or activity
31. use of building and counting blocks
32. hand over hand for writing
33. trace/tracing/highlighting
34. increase home/family/parent involvement
35. consistent family/school communication
36. learn through play other DAP
37. using sensory items
38. using tweezers to build pincher grasp
39. more developed motor skills if attended previous schooling/childcare
40. repetitive activities and practice

41. explicit teaching and modeling of walking in line
42. explicit teaching and modeling of how to listen/follow directions
43. acting out stories
44. arts and crafts activities
45. motivate students with praise, stickers
46. teachers play games with students
47. taking anecdotal notes
48. teachers complete checklists
49. provide a variety of materials for children to use
50. too much technology/too easily accessible for children
51. kids are increasingly more technology savy
52. increasingly less and less interactions with crayons, pencils, or physical books before entering K
53. give families ideas/recommendations for home
54. motivating students with peer/classmate
55. developmentally students generally not ready for school
56. collaborate with other teachers/specialists to help struggling students
57. different size tools and manipulatives
58. use of large/primary pencils
59. use of pencil finger grips
60. weak core muscles
61. weak finger/hand muscles
62. large body movements go with small muscle movement abilities
63. students need proficiency in writing and holding utensils to complete academic tasks
64. collaborate with families
65. attend to all domains of learning