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# Differentiated Experiential Learning Through Play as Supplemental Support for Prekindergarten Students

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# DIFFERENTIATED EXPERIENTIAL LEARNING THROUGH PLAY AS SUPPLEMENTAL SUPPORT FOR PREKINDERGARTEN STUDENTS

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## Dedication

*"Play is often talked about as if it were a relief from serious learning. But for children play is serious learning. Play is really the work of childhood."* -Fred Rogers

This dissertation is dedicated to my three children Heather, Christopher, and Corrine and to my three grandchildren Caitlynn (10), Natalie Jane (3), and Robbie (1) who have taught me the importance of play. I have seen the spark of creativity in each of you when you were learning through play, and you have inspired me in my own life to continue to learn and grow through play. I know that play is serious learning for you. It is my hope for you that through play you will continue to develop your imaginations, express yourselves, and make your mark on the world. May you always find time to play, enjoy what life has to offer, and use your God-given talents to have a positive impact on the world and those around you.

**Acknowledgments**

I first and foremost acknowledge my Lord and Savior Jesus Christ who made it possible for me to pursue this endeavor. The Bible verse that was my continued inspiration throughout this process comes from Philippians 4:13 "I can do all things through Christ Who strengthens me."

I would also like to acknowledge and thank my parents the Reverend Dr. Archie C. Reed, Jr. and Maudalene Y. Reed. My father had a dream that I would be a teacher, and through his inspiration and support, I believed in myself and was able to realize that dream. My mother through her many years as a child development teacher showed me the importance of play and what is possible when working with young children.

My best friend and my rock throughout this process has been the love of my life, my wife, Teresa Reed. She has read and edited this dissertation countless times and has inspired me to continue this journey even when I felt I could not. Thank you for your love, patience, and support and for believing in me even when I did not believe in myself.

I would like to thank and acknowledge those who have helped and supported me in this dissertation process. To my committee chair, Dr. Linda Silvernail, thank you for the tireless efforts, advice, and support you have provided for me. To Dr. Elizabeth Currin, Dr. Leigh D'Amico, and Dr. Suha Tamim, thank you for your willingness to serve on my committee. I could not have completed this dissertation process without the feedback, guidance, and support of all my professors and committee members.

## Abstract

This mixed methods action research study examined prekindergarten students in a Title I program and the impact of differentiated experiential learning though play on their attitudes and learning of mathematical skills as measured by a standardized test. The identified problem of practice involved students not being given enough differentiated experiential learning through play opportunities. The research questions that guided this study are as follows: 1) What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education? 2) How does providing experiential learning through play impact students' attitudes toward math? 3) How does providing experiential learning through play impact students' academic achievement in math? Stakeholders were surveyed to learn their attitudes and perspectives, and students were interviewed to learn their attitudes about the learning opportunities provided. Assessments of students' abilities to recognize numbers and compare quantities were addressed. Statistical analyses were performed to determine the impact and implications of the data collected. An action plan has been proposed to include the developmentally appropriate differentiated experiential learning through play activities used in this study to help children continue to learn and to develop regardless of their developmental level and to provide for continued research on this topic.

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## List of Abbreviations

*CRP* ..... Culturally Relevant Pedagogy

*CRT* ..... Culturally Responsive Teaching

*CSP* ..... Culturally Sustaining Pedagogy

*DAP* ..... Developmentally Appropriate Practice

*DIAL-4* ..... Developmental Indicators for Assessment of Learning

*DiP* ..... Dissertation in Practice

*DSS* ..... Department of Social Services

*IRB* ..... Institutional Review Board

*MyIGDIs* ..... My Individual Growth and Developmental Indicators

*NAEYC* ..... National Association for the Education of Young Children

*PoP* ..... Problem of Practice

*SES* ..... Socioeconomic Status

*ZPD* ..... Zone of Proximal Development

## Chapter 1: Introduction

The following anecdote depicts the experience of a student in my classroom and paints a picture of the feelings and frustrations related to current practices in early childhood education. This student is not unique – his story shows what is possible when experiential learning through play is the center of the educational experience.

Brandon (pseudonym) was only four but already becoming disenchanted with school. "I hate school!" he said. I understood Brandon's plight, and although there was still work that had to be done, I made sure that when we were in centers or on the playground, Brandon and his creativity were allowed to shine through play. Brandon is a very imaginative child who has explained and created many things in his play including a "barracuda" and an "anaconda." One day, Brandon decided he wanted to go on a hunt to catch a "sharktopus," which he described as "a shark with tentacles." Brandon was helped to write a letter asking the principal to help with a hunt for a "sharktopus" and explaining the materials that would be needed. The principal wrote him back, and the next week a hunt for the sharktopus ensued, which included Brandon and all the other child development students. Clues that included writing, math, science, and technology had to be deciphered to find the sharktopus. After searching long and hard, we found the sharktopus! Brandon was a very happy boy and proclaimed, "I love school!"

Experiential learning through play that gets children excited about learning can be happening constantly in our early childhood classrooms. Teachers, however, may need to be creative in order to insert these opportunities into the classroom. Especially in prekindergarten, opportunities for learning through play can be implemented during center time or recess.

However, there has been a reduction in the amount of time children are allowed to be involved in experiential learning through play. This trend is not unique to Dendrite Elementary School (pseudonym) located in the southeastern United States but is happening in schools across the country (Miller & Almon, 2009). In the current climate of early childhood education, questionable methods of academic instruction and standardized testing can be detrimental to the development of young children (Miller & Almon, 2009). I believe it is important to reverse this trend and give experiential learning through play the importance and respect that it deserves to do what is developmentally appropriate for children.

Play, a very important part of the early childhood curriculum, influences children's social, emotional, physical, and cognitive development. Play permits children to express their ideas and feelings and to understand the world (Saracho & Spodek, 1998). Although research clearly shows the importance of a play-based curriculum, this is not what is happening in schools, and this trend is unlikely to change anytime soon.

## Problem of Practice

The child development program in our district was once split into tuition-based and Title I classrooms under one lead teacher. At one point all the centers were Department of Social Services (DSS) regulated and National Association for the

Education of Young Children (NAEYC) accredited providing instruction based on best practice. The program grew and as a result the Title I program had its own lead teacher and the tuition-based program had its own lead teacher. The Title I program leader made the decision not to renew the NAEYC accreditation. The tuition-based program where I taught was recognized as being NAEYC accredited until 2015. In 2015, the tuition-based program was absorbed into the Title I program and the NAEYC accreditation under a new director was no longer recognized. I had been in a program that was DSS regulated and NAEYC accredited since I began teaching in 2005. I had been able to see what was possible when the entire curriculum for students' learning was based on their own inquiries and developmentally appropriate, culturally relevant, constructivist, play-based activities.

Play should be at the heart of any early childhood education program. The research shows the benefits of play for students. Bredecamp and Copple (2002) explain that play is important in the development of children on a social, emotional, and cognitive basis. Test scores are now increasingly the focal point of early childhood education. Instead of students being allowed to develop and grow socially and intellectually through play-based instruction, students are being bombarded with pressures that have young students burning out before they ever get started on their educational journeys, all in efforts to increase test scores (Miller & Almon, 2009). The problem of practice is that students are not given enough differentiated opportunities for experiential learning through play, and as a result many are struggling academically or not performing to the best of their abilities.

At Dendrite Elementary School in my own Title I prekindergarten classroom, I have seen an abrupt shift in recent years from using a child-centered and play-based curriculum to scripted canned math and English Language Arts curriculums that do not emphasize play and leave little to the imagination of the students or the teachers. All child development teachers in the district are expected to teach these curriculums.

Many parents, students, teachers, and even administrators are dismayed that play is not considered as important and crucial to instruction as it once was. For now, test scores trump play-based instruction in early childhood education and are considered more important by decision and policy makers (Nicolopoulou, 2010). Policy makers are overlooking the evidence that young children learn best in settings where children participate in choosing their activities and teachers help them build on their experiences—in other words, not by following rigid curricula designed to increase test scores (Miller & Almon, 2009).

Our district has adopted the Eureka Math Curriculum for prekindergarten. According to the district child development director, the district's math goal for prekindergarten students is "fluency to five" (Q. Evans, personal communication, November 13, 2018). *Fluency to five* means children can subitize or automatically state the number of objects in a set up to five without counting them individually (Carlisle & Mercado, 2012). This goal specifically comes from the SC Early Learning Standards and provides the foundation to subitize, which is one of the state's kindergarten math standards (SCDE, 2019a, 2019b).

Currently, almost one third of the students in my classroom struggle to understand the math concepts presented. These students are not yet developmentally ready for some

of the information presented. Some of them are unable to count to five and do not understand what is meant by the abstract concept of the meaning of *five*. For many students, gaps in school readiness entering prekindergarten are present and, in some cases, widen over time (Heckman, 2006). This lack of developmental readiness for several students can also be attributed to the fact that they are as much as eleven months younger than their peers. Moreover, another third of the students already know and understand the concepts before they are presented and could be challenged to achieve even higher gains than the curriculum presents. Because children do not all have the same levels of development, differentiated instruction is necessary to meet the needs of all students. As a result, the teacher must provide opportunities to allow all learners to demonstrate their skills in different ways (Jackson & Davis, 2000). My goal through this action research study is to determine whether differentiation by the addition of experiential play activities will help to increase academic growth for all students, whether they are struggling, in need of acceleration, or somewhere in between.

An early childhood education classroom should be a place of discovery where students are allowed to play. Children should be encouraged to use their imaginations, fail, make mistakes without fear, and learn to develop various skills such as social, language, mathematical, scientific, technological, artistic, and physical skills. Maslow (1954) in his hierarchy of needs suggests learning is not even possible unless a child's physiological and psychological needs for safety are met. Bredecamp and Copple (2002) explain children's development does not happen in isolation—social and emotional, cognitive, and physical development are closely intertwined. In essence, early childhood education should focus on teaching the whole child with no skill being more or less

important than another. Children should be active contributors in their own learning and development as they try to make meaning of the world (Dewey, 1916; Piaget, 1952; Vygotsky 1978).

Play-based learning is learning. Gopnik (2011) explains students may be able to access an answer to a question more expediently by getting information directly from a teacher, but new information or an original creative solution is less likely to happen. Gopnik (2011) also states that adults may purportedly believe learning happens in an early childhood classroom because teaching and learning are less likely to happen through spontaneous exploration or play; however, she suggests that spontaneous learning is more fundamental. Other researchers support Gopnik's views. For example, Vygotsky (1978) holds that play is a necessity for children to develop representational thinking and abstract thought. Play is not only important but also essential to the development of children (Dewey, 1916; Montessori, 1909/1964; Piaget, 1952).

According to Miller and Almon (2009), kindergarten has become the "new first grade," which leads to the premise that child development may be the new kindergarten (p. 34). Throughout the country, the federally mandated accountability measures have led to increased high stakes standardized tests (Hursh, 2005). This phenomenon pressures teachers to develop successful and increasingly younger test takers. As a result, play becomes a "low priority at best or a time-wasting distraction at worst" (Nicolopoulou, 2010, p. 2). Play, as a result, is increasingly dismissed as unimportant. In the child development program in our district, the amount of time students are allotted to engage in play has been cut in the past three years to make room for the "more important" scripted curricular instruction. However, play, especially for young children, is vitally important.

Vygotsky (1967) contends that play is "the leading source of development in preschool years" (p. 16). Dewey (1916) argued that play fosters experiential learning and social order in a child's development. Saracho and Spodek (2006) have concluded play is at the heart of human culture and achievement, and through play children are able to gain intellectual and social information about their world.

## Theoretical Framework

According to Grant and Osanloo (2014), the theoretical framework is the "blueprint" for a dissertation or the foundation upon which it is built (p. 13). The theoretical framework provides the structure that is necessary to provide a clear vision for the study (Grant & Osanloo, 2014). For this dissertation in practice, two frameworks have been selected: constructivism and culturally relevant pedagogy. Constructivism as it relates to play and the way children learn was examined. In addition, culturally relevant pedagogy was explored in relation to the students involved in the intervention as well as the social justice aspects of the study.

Developmentally appropriate practice (DAP) is at the heart of the theoretical frameworks of this study. As the National Association for the Education of Young Children (NAEYC, 2016) explains, DAP is backed up with research and is based on the way students learn and develop. Copple and Bredecamp (2009) explain three constructs that guide prekindergarten teachers who support DAP, which include the following: (1) a child's developmental attributes that foster their learning; (2) a child's unique differences and understanding of their positive attributes, pursuits, and necessities; and (3) a child's social and cultural context driven by their principles, beliefs, and rules-based behavior.

Using DAP, teachers assess children's individual needs and help them achieve their unique learning goals.

DAP in early childhood education is structured upon play-based instruction and the theories postulated by respected scholars in early childhood education (Piaget, 1952; Vygotsky, 1978; John Dewey, 1916; Froebel, 1887; Montessori, 1909/1964; Rousseau, 1979). From the Piagetian perspective, children construct their own knowledge through play (Piaget, 1952). Vygotsky's (1978) social learning theory promotes the idea that learning is social, therefore children need to be able to have conversations during play to help make sense of the world. Dewey (1916) expected learning to be practical and for students to solve real-life hands-on problems instead of just having knowledge imparted to them. Froebel (1887), known as the father of kindergarten (or *garden of children*), established kindergarten when many believed children under the age of seven did not have the capacity for learning. His original idea of kindergarten was for children to be able to learn and grow freely. Montessori (1909/1964) was a proponent of children learning naturally through play and placed a significant amount of importance on the materials students explore. Rousseau (1979) believed students should be guided but not directly taught by a teacher.

For this research study, the focus was on constructivism as it relates to play and the contributions of the theories of Jean Piaget, John Dewey, and Lev Vygotsky. Piaget (1952) understood that children do not think like adults and as a result do not construct their knowledge in the same ways. He believed their cognitive development must move from the concrete to the abstract and asserted that abstract thought cannot occur without foundational concrete development happening first. Dewey (1938) proposed that

children need to construct learning through questioning and real-world experiences. Dewey (1916) made the case that children need to be personally involved for there to be any real significance to the learning. Consequently, he believed students need to be active in learning and developing their own inquiries. Vygotsky (1978) promoted the idea that learning does not occur in isolation and allowing students to talk through and explore problems with their peers allows them the opportunity to make meaning and gain understanding of their surroundings. Play-based learning provides these opportunities. The common thread for these theorists is that they all support the idea of play as a means of learning for young children. In early childhood education, the essential framework of that play is based on DAP.

Another theoretical framework explored in relation to the students in this study is referenced by Gloria Ladson-Billings (1995) as *culturally relevant pedagogy* (CRP). According to Ladson-Billings (1995), CRP "is a theoretical model that not only addresses student achievement but also helps students to accept and affirm their cultural identity while developing critical perspectives that challenge inequities that schools (and other institutions) perpetuate" (p. 469). Through CRP, Ladson-Billings explains, "Not only must teachers encourage academic success and cultural competence, they must help students to recognize, understand, and critique current social inequities" (1995, p. 476).

In this study, and using CRP, students were helped to learn more about social justice through conversations. In addition, parents, educators, and administrators were given the opportunity to voice their concerns about any educational inequities they believe exist through surveys.

**Purpose of the Study, Research Questions, and Rationale**

In the time I have been teaching child development, I have seen the benefits of play-based instruction. When children are allowed to use their imaginations through play and are not told how and what to think, the possibilities are endless. The purpose of this study was to determine the impact on students learning mathematical concepts by supplementing a scripted curriculum with differentiated experiential learning through play. The research questions were based on the primary objective of helping students of all levels to learn mathematical concepts using play as a supplemental means of instruction.

My goal was to determine if experiential learning through play can be beneficial for students. I did not anticipate differentiated experiential learning through play to have negative effects because I have seen the positive results of using this type of instruction and the benefits it provides to students. Although I am biased toward a play-based learning approach, I examined the research and presented the evidence collected from a neutral perspective with the aim of answering the following questions:

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?
2. How does providing experiential learning through play impact students' attitudes toward math?
3. How does providing experiential learning through play impact students' academic achievement in math?

It is my hope that by providing sufficient answers to these research questions, the benefits of play will be evident enough to at least slow down the disappearance of play in early childhood education.

## Researcher Positionality

The research I conducted on experiential learning through play in early childhood education is important and personal to me. Although I believe this research was the correct course of action, Efron and Ravid (2013) have explained that as a researcher I must accept and recognize my own subjectivity and biases. My positionality must be considered as it relates to the research I conducted.

I have been teaching for sixteen years. For the first nine years, our program used what I believed to be a developmentally appropriate, play-based curriculum. I was able to see first-hand the imaginations of children at work. Students were problem solving, making up their own play scenarios, and as a result, constructing their own learning. Experiential play-based learning is best practice and stems from the theories of Jean Piaget, John Dewey, Maria Montessori, and Lev Vygotsky, who believed that learning should be based in play for children (as cited in Mooney, 2000).

I have benefitted from not struggling with the experience of poverty, and I grew up in a stable two-parent home. I have had the advantages of being White and male in our society. My background contrasts with many of the Title I students I teach. I want my students, regardless of their socioeconomic status (SES), race, or gender, to have every educational advantage possible. I believe experiential learning through play is best practice and the correct approach for all students' success.

Having seen prejudice and bigotry towards the very population I teach, I have always wanted to be part of the solution instead of part of the problem, and in my role as an educator, I am granted a huge opportunity and responsibility. According to Herr and Anderson (2015), a researcher's positionality refers to who a person is in relation to the participants and setting. The fact that I am a White, middle-SES male who has had advantages put me in a position to be reflective on this journey and gave me the opportunity to learn more about how to address issues of race and prejudice. My positionality was situated precariously on the continuum of Herr and Anderson (2015) since I have taken on the outsider role as a White male teaching primarily students of color. I am also in this role in relationship to the families of the students I teach. Working in collaboration with peers, however, situated me in the role of an insider with respect to other teachers and once again as an outsider when working with administration.

Play in early childhood education is increasingly dismissed as unimportant, and for me this is unacceptable. I am biased in favor of experiential play-based learning. I knew this bias could have influenced my research and that I needed to be very careful not to let this bias do so. Trustworthiness is of the utmost importance, especially in an action research study because of the proximity of the researcher to every aspect of the research. Merriam and Tisdell (2016) explain that the quality and quantity of evidence persuades the reader that the study is trustworthy. Through collaboration with the stakeholders in the collection of data, a study can maintain its integrity.

I teach in a Title I child development program. The four-year-old students who are given priority to enter our program are from low-income families. The population in the location where I teach is 90.4% minority and primarily a Black population. In grades

prekindergarten through fifth, there are 483 Black or African American, 2 American Indian, 21 Asian, 47 Hispanic or Latino, 0 Hawaiian or other Pacific Islander, 63 White, and 40 students of two or more races. Of these students, 50.15% receive free or reduced lunch (SCDE, 2019c, 2019d). I get to see first-hand some of the aspects of my students' cultural heritages and learn more about their historical landscapes by working with our parent educator and families to build relationships.

The students for the program are selected on a needs-basis. The students and families who are in the most need of the program and children who qualify as "at-risk" get preferential treatment for entering the program. Students range in age between four and five years old. In the class involved in this study, there are 18 students, and 15 of those students are African American; 9 identify as female and 9 as male.

I have learned through speaking with the parents and students that many of the students I teach do not yet have many play-based experiences. I believe these students need as many play-based opportunities as possible. During a typical year, we go on a minimum of nine free field trips to help facilitate more experiences for the students; however, due to COVID-19, this was not possible in the study year. Another way every student experiences the world is through race, class, gender, and cultural influences (Banks, 1993; Ladson-Billings, 1995; Nieto, 1999; Paris & Alim, 2014). Some students have relayed to me how their parents feel about White people, men, and teachers. The feelings expressed have been positive and negative, but perceptions can be shaped through experiences. Paris (2015) states that in 1970 80% of the public-school students were White and today over 50% are students of color, again giving rise to the need for continued change in education. Students and parents need to be given the opportunities

to talk about race and systemic injustices. Cultural competence needs to be addressed. It is my goal to perpetuate Ladson-Billings' (1995) model of culturally relevant pedagogy in my classroom "to foster social relationships to achieve student success, cultural competence, and critical consciousness by sustaining fluid student-teacher interactions, showing a connectedness with all students, facilitating a community of learners, and helping students to learn together and be responsible for each other" (p. 480).

## Research Design

Before conducting the research study, Institutional Review Board (IRB) and district approval were obtained. The IRB did not recommend or require parent/guardian or student consent for this study. However, I informed parents of the study and shared the results upon its completion. The study was conducted specifically in the elementary school in which I teach, and I collaborated with peer child development educators as well as other early childhood educators and administrators at the school. I also worked with parents and district personnel to achieve the goals of the study. This study took an action research, mixed methods approach.

According to Efron and Ravid (2013), "Action research is usually defined as an inquiry conducted by educators in their own setting in order to advance their practice and improve their students' learning" (p. 2). Action research was chosen because it was necessary for me to be directly involved in the implementation of the study to make changes that directly affected the students in the study as well as specifically impacted my own teaching practices. The objective of a mixed methods approach is to use the strength of quantitative and qualitative research. Combining these research methods allows the researcher to explore different aspects of a question using multiple methods

(Efron & Ravid, 2013). A mixed methods approach was appropriate because a quantitative or qualitative approach did not specifically address all necessary questions and concerns. The premise of quantitative research is to use numerical data gathered from groups or individuals using statistics to analyze the data collected (Slavin, 2007). Qualitative research investigates events in their natural settings and the focus is on the meanings of these experiences for the participants in the study (Efron & Ravid, 2013).

The quantitative aspects of the study were addressed using specific numerical data and statistical analysis that were obtained by using pre- and post-tests. A portion of the qualitative data were provided by parents and other stakeholders who were surveyed to share their perspectives on the experiential learning through play supplemental support that was provided. The remaining qualitative piece of the study provided information about the attitudes of the students toward the supplemental instructional support provided. This information was provided through semi-structured interviews with students using mostly open-ended questions. To ensure internal validity for interviews, member checks were a part of the process (Merriam & Tisdell, 2016). I conducted observations of the students participating in the supplemental math play activities and recorded that data in a journal. Direct observation of students learning information through a play-based teaching methodology provided insight into why the prescribed approach did or did not help students achieve success in all aspects of learning. To manage and organize the data collected, I devised a system for coding. Data were inserted into a Microsoft Excel spreadsheet and color coded by frequency to highlight themes and patterns. I ensured that biases were controlled through triangulation, peer

review, and collaboration with multiple participants during the research process (Merriam & Tisdell, 2016).

**Data Collection and Analysis**

Data were collected in this study using a variety of instruments including the previously mentioned pre- and post-tests. A survey was given to stakeholders to determine the level of importance they believe that play serves in children's learning. Surveys are an efficient way to gather information about the participants' opinions and attitudes about the study (Merriam & Tisdell, 2016). The surveys used open-ended questions to learn the perspectives of all stakeholders. Different stakeholder groups shared differing perspectives depending on who they were. In addition, I conducted interviews with students using open-ended questions to gain multiple insights and perspectives. Interviews were conducted in a one-on-one setting and member checking took place to ensure the accuracy of the data collected (Efron & Ravid, 2013). I conducted student observations to observe children's experiential play-based learning and the data were coded to transform it into a form suitable for analysis.

The quantitative data collected were analyzed to determine if the experiential learning through play activities had an impact in improving the mathematical achievement of the students. My Individual Growth and Development Indicators (myIGDIs) is the district-required standardized test for prekindergarten mathematics (see Appendix A). The myIGDIs pre-tests were subtracted from the myIGDIs post-tests to discover whether individual students made progress or regressed.

Qualitative analysis included survey data that was color coded on a spreadsheet to highlight themes and patterns. The data were used to determine stakeholders' attitudes

and perspectives on the value of play in early childhood education (Efron & Ravid, 2013; Herr & Anderson, 2015; Merriam & Tisdell, 2016). In addition, semi-structured interviews with students were analyzed to determine the attitudes of the students toward the experiential learning through play activities used during the intervention. As another level of analysis and confirmation of findings, data were triangulated. "*Triangulation* is the practice of relying on more than one source of data by using multiple methods or obtaining varied perspectives" (Efron & Ravid, 2013, p. 70). Triangulating information may lead to emerging patterns or themes which can add to the validity of the study (Creswell & Creswell, 2018).

## Significance and Limitations of the Study

Experiential learning through play as supplemental support for young children was of concern and the basis for this study. This was the argument presented as a problem of practice with an extensive explanation of the benefits of play and my contention as the researcher that learning through play is the way that young children learn best. This contention is one of the cornerstones of DAP and is based in the work of Dewey (1916), Piaget (1952), Montessori (1909/1964), and Vygotsky (1978). Bredecamp and Copple (2002) provide guidelines for curriculums, which should include aspects that have social relevance, are intellectually challenging, and are personally meaningful to students. There is no such thing as a one-size-fits-all curriculum. By supplementing the existing curriculum, students who are underperforming, or developmentally not ready for the level of expected performance by the district, and students who are more accelerated can both benefit and reach their highest potential.

I chose action research as the approach for this study so I could conduct a study that would directly benefit my own students, and through collaboration with different stakeholders, I was able to inform my teaching practices and potentially the teaching practices of others in my own setting as well. Action research also allowed me to participate in all aspects of the research and to be directly involved in the entire process. Efron and Ravid (2013) explain action researchers are not concerned whether what they have learned is generalizable to another setting, their goal is to address particular concerns that will improve their practice and the achievement of their students. Herr and Anderson (2015) argue that traditional research based on formal generalization is less useful to classroom practitioners than narrative accounts that provide vicarious experience as in action research.

The intended audience or the individuals who could be affected are the students, teachers, parents, administrators, district personnel, and potentially community members. All these individuals could benefit as a result of this research. Students could benefit by increased learning in a developmentally appropriate way through play that will build a foundation for performing at full potential. Teachers could potentially learn to introduce additional developmentally appropriate practices that will help their students. Parents could see their students improving regardless of the level where they began. The real challenge and concern for administrators and district personnel will be finding out if the supplemental support using experiential learning through play that has been differentiated for students has an impact on math scores. Other practitioners and administrators may find this research enlightening because I am attempting to reach all students and not only the students who fit into a particular expectation of where they should be academically.

Students' needs were addressed using differentiated experiential learning through play regardless of their academic level. If successful, this tiered model could serve as an example to the entire district and potentially other districts.

One major limitation or challenge of the study was the fact that I had to use the existing math curriculum and could only supplement it to improve student achievement. The district has mandated that the Eureka math curriculum must be used by all teachers in prekindergarten. Bredecamp and Copple (2002) suggest that a developmentally appropriate curriculum should have realistic and attainable goals for all students and should be play-based and child-centered. Although Eureka math does use several manipulatives for students, the curriculum also incorporates worksheets which are considered developmentally inappropriate for young children (Bredecamp & Copple, 2002). In addition, the curriculum does not adequately address the needs of the students who are far below or far above the level of the material being put forth. Eureka math and myIGDIs are both required by the district; however, their conflicting requirements could negatively impact student outcomes. The Eureka math curriculum closely aligns with the state standards, but it does not align well with the myIGDIs assessment. For example, Eureka math only requires students to rote count to 20, while the myIGDIs assessment may require them to count higher to be considered proficient (dependent upon a child's age). Eureka math requires students to recognize and use one-to-one correspondence counting only for numbers up to 10; however, the myIGDIs assessment expects students to recognize numbers 0-20 and use one-to-one correspondence counting up to 20. In addition, Eureka math only expects students to subitize for quantity comparison up to 5, but the myIGDIs assessment requires students to subitize up to 6.

## Organization of the Dissertation

Following Chapter 1, a literature review is provided including a rationale for the study and an explanation for the importance of the research conducted. The importance of play in early childhood education as well as the theoretical basis for play is described. The methodology, research design, data collection strategies, and data analysis are extensively addressed. Visuals are supplied when deemed appropriate. A rich discussion of the findings and actions taken as a result of the study are given as well as a reflection. The limitations of the study and suggestions for further research and a conclusion is included in the subsequent chapters of this dissertation in practice.

### Definitions

The key terms or definitions that have been addressed at this point in the study are as follows:

**Action Research –** A study that is conducted by teachers in their own setting to advance their own teaching practice and those around them to improve student achievement (Efron & Ravid, 2013).

**Canned Curriculum** – A curriculum that is completely prepared and scripted for the teacher to teach. The teacher follows a guide with step-by-step instructions to administer the curriculum.

**Child-centered Curriculum** – A curriculum that is focused on the student instead of the teacher.

**Developmentally Appropriate Practice (DAP) –** Teaching students on their developmental level with a knowledge of how students learn, grow, and develop socially, cognitively, culturally, and emotionally.

**Early Childhood Education** – Education of young children prekindergarten through third grade.

**Eureka Math –** A mathematical curriculum that is touted as being the most widely used in the United States of America.

**High-Stakes Test –** Any test used to make important decisions about students, educators, schools, districts, or accountability.

**MyIDGIs (**My Individual Growth and Development Indicators**)** – A set of assessments designed to monitor the growth and development of pre-K students.

**Play-based Learning** – This is essentially learning various concepts through play.

**Stakeholders** – The individuals who are affected either directly or indirectly by this study are the stakeholders. These individuals would include but not be limited to the following: students, teachers, parents, administrators, district personnel, and potentially community members.

**Subitize –** This is the ability to quickly identify the number of items in a small set without the need to count them (Carlisle & Mercado, 2012).

## Chapter 2: Literature Review

Play is not easily defined and can come in many forms. However, according to Peter Gray (2008), a foremost authority on play, the definition of play includes these five parameters:

(1) Play is self-chosen and self-directed.

(2) Play is activity in which means are more valued than ends.

(3) Play has structure, or rules, which are not dictated by physical necessity but emanate from the minds of the players.

(4) Play is imaginative, non-literal, mentally removed in some way from "real" or "serious" life.

(5) Play involves an active, alert, but non-stressed frame of mind (p. 1).

The importance of play cannot be overstated when it comes to early childhood education. Play should be at the center of any early childhood education program (Nolan & Paatsch, 2018; Watchman & Spencer-Cavaliere 2017). Play as a vehicle for learning is a very important part of the early childhood curriculum and affects children's social, emotional, physical, and cognitive development (Kemple, Oh, & Porter, 2015). An early childhood education classroom should be a place of discovery where students are allowed to explore. Children should be encouraged to use their imaginations, fail, make mistakes without fear of reprisals, and learn to develop various skills such as: social, language,

mathematical, artistic, and physical (Kargi & Yazgin, 2018; Park, Chae, & Boyd, 2008; McClintic & Petty, 2015; Miller & Kuhaneck, 2008). Essentially, early childhood education should be concerned with teaching all areas of development, giving equal attention to all skills being taught. Learning through play is learning. However, there is a smaller amount of time that young children are allotted to be involved in education practices that involve experiential learning through play (Miller & Almon, 2009). There are a number of reasons young students are spending less time learning through play including a major focus on academics and test scores, distorted perceptions of what play should be for young children, as well as those in positions of authority who discount play as unimportant (O'Brien & Smith, 2002; Majors & Baines, 2017). Experiential learning through play is not only important, but also essential to the development of children. The problem of practice (PoP) for this dissertation in practice (DiP) is that students are not given enough differentiated opportunities for experiential learning through play, and as a result many are struggling academically or not performing to the best of their ability.

**The Problem of Practice in Context**

At Dendrite Elementary School the focus for this study was on addressing the limitations of using a scripted math curriculum. In the last three years there has been an abrupt shift from a child-centered and play-based curriculum to a canned (scripted) curriculum that leaves little to the imagination of the student or the teacher. All child development teachers in the district are required to teach this curriculum.

Approximately one-third of the students in the class under study struggled to learn the mathematical concepts presented. They were simply not yet developmentally ready for the symbolic and abstract information presented. The lack of developmental

readiness for many of these students can be attributed to the fact that they may be as many as eleven months younger than their peers. In addition, because of their age, exposure, and developmental level, another third of the students already knew and understood the concepts before they were presented and could be challenged to achieve even higher gains than the curriculum presented. Differentiated instruction was necessary to meet the needs of all students, and I provided these opportunities during this study.

**Purpose Statement**

The purpose of this study was to learn the attitudes of parents, educators, and administrators on the value of play, and to determine the scholastic impact and attitudes of students who were learning mathematical concepts using a scripted curriculum supplemented with differentiated experiential learning through play. The study also determined students' attitudes toward play-based learning activities. It is my aspiration that by providing adequate answers to the following research questions, the benefits of play will be evident enough to at least decelerate the disappearance of play in early childhood education.

I did not expect differentiated experiential learning through play to have adverse effects because of my own teaching experiences that have only shown positive results using play-based instruction. Having an awareness that I am biased toward a play-based approach to learning, I was very careful in my examination of the research to present the evidence as collected with the goal of answering the following questions:

## Research Questions

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?
2. How does providing experiential learning through play impact students' attitudes toward math?
3. How does providing experiential learning through play impact students' academic achievement in math?

## Chapter Organization

Chapter 2 of this DiP incorporates the literature as it pertains to early childhood education and the benefits that play provides as a means of educating young children. The purpose of the literature review is explained, followed by an explanation of the importance of play and the theoretical framework for the study. In addition, an explanation is provided for how social justice relates to the study. Research studies that examine play as a teaching methodology are incorporated, and the chapter concludes with a summary of the literature.

## Purpose of the Review

A literature review was conducted in this action research study for the purpose of uncovering the PoP. According to Machi and McEvoy (2016), a literature review presents an argument in support of the researcher's thesis by helping to build a case based on evidence from previous research. This literature review provides a summary of information provided by others that is pertinent to my own inquiries and will establish a rationale for the current study by demonstrating the salience of the research questions (Efron & Ravid, 2013). I am also keenly aware that new literature is constantly surfacing

that may affect the current study. Herr and Anderson (2015) explain that a literature review in an action research dissertation should provide an adequate amount of literature to frame the initial research question, but with the assumption that the review of literature will continue throughout the research process. This initial review frames for the reader the perspective of the researcher in relation to the inquiry and the research that informs that perspective.

Each of the materials for this review was specifically chosen to provide the most complete picture of the reasoning for the literature review itself as well as the action research study overall. These materials provide information that will inform as well as educate others about the importance of play in early childhood education. In addition, studies conducted by other researchers on the topic of play that were germane to this study were evaluated and selected for consideration based on their relevance and usefulness. By mining reference lists from the work of these researchers, I was able to find many viable and credible sources as well as learn what research has already been done on the subject. Google, ERIC, Education Source, EBSCO, and PsycINFO were all used as sources for this review in addition to peer-reviewed journals, the books of many different theorists, and textbooks.

## The Importance of Play

As stated previously, the importance of play for young children cannot be overemphasized. Play should be the focus of the curriculum, and play is crucial in the development of children. Play will also be addressed as it relates to developmentally appropriate practice (DAP) as a teaching methodology. In addition, many theorists have

proposed their views on play as it relates to the education of young children, which will be examined.

**Play and the Curriculum**

If play is to be the basis for the curriculum, this also means that the learner or the child will be the focus of the curriculum and all areas of teaching and assessment will take the children's needs into consideration when planning such a curriculum (Bredekamp & Copple, 2002). In a play-centered curriculum, the teacher is the key and must be ever mindful that the curriculum is constantly developing, emerging, and evolving (Van Hoorn, Nourot, Scales, & Alward, 2015). Teachers must be skilled at using multiple teaching strategies that include seamless transitions for guided play, self-directed or spontaneous play, specific subject instruction, and back to play-oriented activities (Van Hoorn et al., 2015). Play may include one-on-one, and small or large group activities with students, but should always be purposeful, meaningful, and engaging for children (Van Hoorn et al., 2015). As explained in detail earlier, play should be constructivist and social in nature so that the students are making meaning from the learning and constructing their own knowledge to make sense of the world (Piaget, 1952; Vygotsky, 1978). The play curriculum must be planned with DAP in mind making sure that the curriculum is meaningful, respectful of students' cultural backgrounds, includes student choice, allows for social interaction, is appropriately challenging, and adult guidance is provided for students' individual needs (Copple & Bredekamp, 2018).

In a play-centered classroom, teachers design play areas and set-up the classroom to be an extension of the curriculum (Van Hoorn et al., 2015). Teachers provide play

areas in the room that by design are loud and quiet and stimulate the five senses of children. Through different areas children can learn mathematical, spatial, literacy, technological, tactile, scientific, gross motor, fine motor, and social skills to name a few (Bredekamp & Copple, 2002). By interacting with other students socially in a playful environment, students can learn important life skills like taking turns, using words to articulate needs, and getting along with others (Vygotsky, 1978). When play is the basis for the curriculum, every situation that occurs during the child's day is a learning experience.

Play can also be used as a tool for assessment when learning is child-centered, and play is at the center of the curriculum (Bredekamp & Copple, 2002). Teachers assess students through anecdotal observations, questioning for understanding, collecting products of play for portfolios, as well as checklists, pictures, and video clips (Van Hoorn et al., 2015). All these methods can be used to inform parents of their child's progress. These are means that allow the teacher to connect with the parents and show the parents what their child has been learning through play (Van Hoorn et al., 2015). Through communication, the teacher may be able to learn from the parents or interpret some of the play actions in the classroom by the child (Bredekamp & Copple, 2002). Involving the parents as much as possible in a child's education is beneficial to the student and helps the teacher in teaching the "whole child" (Van Hoorn et al., 2015).

A play-based curriculum in child development allows a child through play experiences to develop and learn their own strengths and interests (Copple & Bredekamp, (2018). By learning through play in various contexts, children are building a foundation for more formal instruction in traditional school subject areas such as math, social

studies, literacy, sciences, and the arts as children use the new knowledge they have constructed in more formal contexts (Van Hoorn et al., 2015).

**The Necessity of Play for Young Children**

Play is a necessity for young children's growth and development and scientific research supports this premise (Weisburg, Zosh, & Hirsh-Pasek, 2013). The scientific community is perpetually discovering the relationships between play in children and their development in many areas, including language, math, and spatial skills, executive functions, and emotional and social development (Bredekamp & Copple, 2002). Scientific research has determined that play contributes to the learning process because learning happens best when children are mentally active, when they are engaged, socially interactive, and creating meaningful relationships with others (Weisberg et al., 2013). This is what needs to be happening in schools for students to be successful.

Play is integral to brain development as well. Play helps children develop their executive functions of the brain that are critical for success in school (Bodrova & Leong, 2005). Children who are given quality play experiences are more likely to have good memory skills and language development and are able to self-regulate their behavior, all of which can have positive effects on school adjustment and academic learning (Bodrova & Leong, 2005). In direct contrast, when children do not have opportunities for quality play experiences, it affects how the neurons in their brains are developing, which affects their functionality, and will have lifelong effects (Weisberg et al., 2013). Children need play experiences to develop these neurons. In cases where children have suffered from severe play deprivation, they have suffered abnormalities in neurological development; however, by providing play experiences, the situation can be at least partially remediated

(Weisberg et al., 2013). It was my sincerest hope that children would continue to have interactive play experiences during this pandemic, but even in my own classroom students had to socially distance during play activities to remain safe. Play is of the upmost importance, but safety is even more important.

Long-term studies have determined that play-based child development centers have yielded far greater results than academic-based early learning centers (Miller & Almon, 2009). Unfortunately, as Miller and Almon (2009) lament, educational practices have little to do with what we know about good pedagogy. Educational policies are determined by political, economic, cultural, or the personal agendas of individuals (Nicolopoulou, 2010). The "earlier is better" approach in education seems to be the latest trend meaning kindergarten is the "new first grade," and one can only assume with that logic, child development is the new kindergarten (Miller & Almon, 2009, p. 34). Sadly, many of these educational policies do not promote DAP. As a result, students are being required to meet standards that are not developmentally appropriate and are being frustrated because we are taking away their main mode of dealing with stress which is child-initiated, child-directed, intrinsically motivated play (Nicolopoulou, 2010).

**Developmentally Appropriate Practice**

Developmentally appropriate practice (DAP) is the foundation for the constructivist theoretical framework of this study. The National Association for the Education of Young Children (NAEYC, 2016) explains, DAP is supported with research and is based on the way students learn and develop. Using DAP, teachers address children's individual needs where they are and help children achieve their unique learning goals (Bredekamp & Copple, 2002). DAP is based upon three core

considerations: knowing about the development of children and how they learn, knowing what is appropriate for children individually, and knowing what is important culturally for children (NAEYC, 2016). Cultural development for the child includes their family history, structure, and community (Copple & Bredekamp, 2018).

For DAP to occur, the teacher must understand the young child and the needs that children require (Bredekamp & Copple, 2002). Teachers need to know their students and be well-versed in the use of multiple teaching strategies to meet the needs of all learners (Van Hoorn et al., 2015). Multiple teaching strategies may even be required in the same lesson to adjust to the needs of the students and the many ways they may process the material presented (Copple & Bredekamp, 2018). The teacher must be dedicated to making sure that each student's needs are being met by understanding the child's skill level and how they learn. Meeting each individual child's needs does not mean treating each child the same or equally but supplying what each child needs to learn and grow (Van Hoorn et al., 2015). This does not mean watering down the material to be taught but may mean adjusting to help students meet their goals without becoming frustrated. Meeting students where they are developmentally, teachers must use authentic or meaningful assessments to be keenly aware and sensitive to meet the needs of students (Copple & Bredekamp, 2018).

DAP in a child development or prekindergarten setting means that teachers work with families to help each child grow and develop to their full potential in all areas of development (Bredekamp & Copple, 2002). Teachers must build relationships with each individual child for the best learning outcomes to occur. The teacher must also provide an interesting and enriching learning environment to facilitate the learning experiences

the child will need to grow and prosper (Schiro, 2013). The experiences child development teachers provide may be experiences that the child cannot have outside of school because these opportunities may not exist elsewhere (Van Hoorn et al., 2015). In a developmentally appropriate classroom, learning experiences may be led by the children or by the teacher (Bredekamp & Copple, 2002). When learning experiences are led by children, this means learning through play, and is essential in young children's learning. When learning experiences are led by the teacher, they should be entirely child-centered and involve multiple teaching strategies to meet the needs of all students (Copple & Bredekamp, 2018).

Children construct their own learning through play and their experiences in the world (Dewey, 1938; Piaget, 1952; Montessori, 1909/1964). Play and teaching through a constructivist approach is developmentally appropriate and helps children in cognitive, social, emotional, language, and physical development (Copple & Bredekamp, 2018). Play as a teaching methodology in early childhood education should include free play that allows children to get messy, make mistakes, and make meaning on their own. Play may also be structured at times for teachers to help children to dispel misconceptions they may have constructed on their own (Ertmer & Newby, 1993). Play using DAP and the constructivist approach should include objects in the environment that the child can act upon as well as an allowance for social construction through play (Piaget 1952; Vygotsky, 1978).

**Theoretical Views of Play**

Early childhood education is structured upon play-based instruction (DAP), and the theories postulated by many respected scholars, which include, but are not limited to

the following: Jean Piaget, Lev Vygotsky, John Dewey, Maria Montessori, Friedrich Froebel, and Jean-Jacques Rousseau. Rousseau was prominent in the early 1700s and Froebel in the early 1800s. The other theorists discussed were prominent in the 20th century. From the Piagetian perspective, children construct their own understanding through play (Piaget, 1952). Vygotsky's (1978) social learning theory promotes the idea that learning is communal, therefore children need to be able to speak with each other during play to gain understanding and construct knowledge. Dewey (1938) expected learning to be pragmatic and for students to solve actual realistic problems instead of just having knowledge given to them. Ironically, Froebel (1887) created the first kindergarten when many thought children less than seven years old did not have the ability to learn. The initial idea of kindergarten was for children to be able to learn and grow unencumbered (Froebel, 1887). This is a far cry from what early childhood education is becoming today using direct instruction teaching methods that contrast with DAP. Montessori (1909/1964) was in favor of children learning through play and placed a great deal of significance on the materials the students used to learn. Rousseau (1979) believed students should be assisted, but not directly instructed by a teacher. In a play-based, developmentally appropriate classroom, the learning is teacher-guided instead of teacher-directed, and students are the focus not the teacher. In addition to supporting a constructivist philosophy, all these theorists support the idea of play as a means of learning for young children and in early childhood education the framework of that play is based on DAP. By melding the ideas of these theorists, children can learn at an appropriate developmental level through play and construct knowledge to make sense of the world around them.

A learner/child-centered ideology is the only perspective that makes sense if following the tenets of DAP. Focusing on a child's needs is of paramount importance in this ideology and the only driving force when considering how and what to teach.

## Theoretical Framework

The theories of progressivism, constructivism, social constructivism, and the theorists who proposed them will be discussed. In addition, a comparison of the commonalities the theorists share related to play will be examined.

### Progressivism

John Dewey is known as the "father of progressive education" (Slaughter, 2009, p. 16). Progressive education was a term given in response to "traditional" education (Kennedy, 2019). In the perspective of Dewey (2017), schools should focus on two major premises: the social and psychological aspects of educating a child with neither having precedence over the other. In his time, traditional education valued the memorization of principles and facts which in Dewey's view was a waste of the child's time when children should be gaining an understanding of what is being taught. The students needed to learn by doing through practical measures that build relevant life skills (Dewey, 1938). In the traditional view of education, the focus is on the teacher and what they can teach the child. In Dewey's progressive view of education, the focus is child-centered and focused on the practical and relevant ways they can learn. Dewey was concerned not only with students as good learners, but also with students' moral character and teaching them to be good citizens (Dewey, 1916). This was Dewey's view of teaching the "whole child." Dewey (2017) also believed that the learning curriculum should be dichotomous with a child's standpoint, which included active learning, and a

teacher's standpoint, that should include subject matter. Cognitive dissonance is a part of the process (Applefield, Huber, & Moallem, 2001). Students need that conflict within themselves to seek answers that make sense and allow for new learning to occur.

**Constructivism**

The constructivist approach gives children the autonomy to explore, discover, and make meaning out of their play (Montessori, 1909/1964; Piaget, 1952). Essentially, constructivism is a "whole child" approach, meaning that all of a child's needs are met including social, emotional, physical, and cognitive (Van Hoorn et al., 2015). In constructivism, students are creating knowledge out of their own experiences instead of through passive reception of information. In many cases, traditional education requires students' learning to be completely receptive. Students are to be passive vessels that collect knowledge disseminated by a teacher (Schiro, 2013). A counterargument to the constructivist approach is that students may construct knowledge or perspectives that are false or contrary to what may be perceived as correct. In a constructivist classroom, the teacher as the facilitator can guide students in their learning to help them through experiential learning discover what is right and true (Ertmer & Newby, 1993). The role of the teacher is to teach the student how to construct meaning and evaluate and update those constructions. In addition, the teacher should design experiences for the student so that authentic context can be experienced (Ertmer & Newby, 1993).

John Dewey (1938) also shared the constructivist point of view and proposed that children need to construct learning through questioning and real-world experiences. Dewey (1916) made the case that children need to be personally involved for learning to be significant. According to Dewey, learning needs to be practical and students should

learn by solving actual problems instead of just having knowledge transmitted to them (Dewey, 1938). The students need to be active in the learning and developing their own inquiries.

Constructivism, according to Jean Piaget (1952), is learning that is based on experiences. Piaget understood that children do not think like adults and as a result do not construct their knowledge in the same ways. He contended that their cognitive development must move from the concrete to the abstract, and that abstract thought cannot occur without foundational concrete development happening first. For Piaget (1985), children construct knowledge by incorporating new experiences into their existing understandings through *assimilation or equilibrium* and *accommodation* or *disequilibrium*. "Assimilation is the action of the child on surrounding objects, while converse action, accommodation is the action of the environment (objects) on the child…Play is essentially assimilation (action on objects) or the primacy of assimilation over accommodation" (Frost, Wortham, & Reifel, 2008, p. 39).

Maria Montessori shared a constructivist point of view and was also an advocate of play. Montessori (1967) recognized play to be the child's work stating, "A child chooses what helps him to construct himself" (p. 233). Piaget agreed; however, he believed that she was mistaken in her requirement of "standardized material," saying instead that "the really important thing is for the child to construct his own material" (Evans, 1973, p. 52). Piaget's constructivist views on epistemology, and as a result his views on education, support free play and advocate for a gracious amount of child-directed activity and learning (Evans, 1973). Using this logic, an argument for the pedagogical value of play using the constructivist approach can be made to schools today.

**Social Constructivism**

Lev Vygotsky's perspective was that children do construct their own knowledge; however, development cannot be separated from its social context, and language plays a major role in mental development, which cannot be separated from its social context (Bodrova & Leong, 2007). Vygotsky's view was that play promotes cognitive, emotional, and social development.

Vygotsky (1978) promoted the idea that learning does not occur in isolation and allowing students to talk through and explore problems with their peers allows them the opportunity to make meaning and gain understanding of their surroundings. Play-based learning provides these opportunities. Vygotsky (1967) believed that play establishes a *zone of proximal development* (ZPD) referring to situations under which a child's understanding is deepened as a result of social interactions. "Play is the source of development and creates the zone of proximal development" (Vygotsky, 1967, p. 16).

In contrast to Vygotsky, Piaget (1952) promoted the idea of knowledge construction through a child's interactions with physical objects and not people. Whether knowledge is constructed through a child's interactions with physical objects or people is debatable. However, Applefield et al., (2001) postulate, "Constructivism proposes that learner conceptions of knowledge are derived from a meaning-making search in which learners engage in a process of constructing individual interpretations of their experiences" (p. 37).

A common theme for these theorists is that they all support the idea of constructivism and play as a means of learning for young children. Learning, by constructing meaning through play, requires the child to be an active learner (Dewey,

1938). The construction of that knowledge may differ from the meaning or interpretation that others may derive from the learning experience, but what has been learned belongs to the learner (Piaget, 1952). Knowledge is not simply disseminated without being questioned by the student. Through questioning and experience, the learner constructs meaning (Dewey, 1938). In constructivism, the teaching methodology is the play experience itself. In a constructivist classroom, the teacher is the facilitator of knowledge by providing the experiences for the students to interpret or construct their own meaning (Schiro, 2013). I used a constructivist approach during this study to provide learning opportunities that allowed students to construct their own experiential learning through play.

Progressivism and constructivism are not antithetical to one another and are sometimes used interchangeably when referring to a learner-centered teaching approach (Schiro, 2013). Both are child-centered and focus on learning by doing. Progressivism as an ideology is concerned with helping a child develop a relationship with society (Dewey, 1916), and constructivism focuses on children constructing their own knowledge through interaction with objects in the environment (Piaget, 1952).

## Social Justice in Early Childhood Education

Young students need to be taught about fairness and equity as well as a respect for other people. Students need to have an opportunity to learn through a curriculum that is free of bias and learn to recognize the importance of their own culture and the cultures of others. Through these practices, children can learn about the importance of social justice. The merits of an anti-bias education, culturally responsive teaching, culturally relevant

pedagogy, culturally sustaining pedagogy, equity of access and cultural norms will be considered in relation to my study and social justice.

**Anti-Bias Education**

Children are never too young to learn about social justice and being respected regardless of their race, ethnicity, culture, or socio-economic status. According to Derman-Sparks and Edwards (2009), there are four goals for an anti-bias education:

> **Goal 1:** Each child will demonstrate self-awareness, confidence, family pride, and positive social identities.
>
> **Goal 2:** Each child will express comfort and joy with human diversity; accurate language for human differences; and deep, caring human connections.
>
> **Goal 3:** Each child will increasingly recognize unfairness, have language to describe unfairness, and understand that unfairness hurts.
>
> **Goal 4:** Each child will demonstrate empowerment and the skills to act, with others or alone, against prejudice and/or discriminatory actions (pp. 3-5).

In early childhood education, this begins with an anti-bias curriculum. Derman-Sparks (2001) explains why an anti-bias curriculum is important and how to create an anti-bias environment. Derman-Sparks (2001) gives clear-cut ways to teach young children about racial differences and similarities, disabilities, gender identity, cultural differences and similarities, how to resist stereotyping and discriminatory behavior, activism, and working with parents. Education is the key to making certain that all people are shown respect regardless of who they are, where they come from, or what they look like. "It is necessary for each individual to actively intervene, to challenge and counter the personal and institutional behaviors that perpetuate oppression" (Derman-

Sparks, 2001, p. 3). Students need to know from an early age how to treat others and not to perpetuate stereotypes. It is also imperative that students see themselves and their cultures represented in the curriculum to see the relevance of the material presented (Nieto, 1999). I used anti-bias materials in the play activities over the course of this research study.

In addition to learning how to be respectful of others through the use of an anti-bias curriculum, culture is a very important aspect for teaching young students. For learning to be meaningful and significant, students must be able to relate what they are learning in school to their own lives. The following pedagogical theories provide a foundation for learning based on students' cultures and the ways that children learn best.

**Culturally Responsive Teaching**

"Culturally Responsive Teaching (CRT) is defined as using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively" (Gay, 2000, p. 106). This includes the play experience of children. An early childhood classroom should be a culture-rich play environment. Howard (2010) explains, "Culturally responsive teaching is a response to the ongoing achievement disparities between African American and Latino students, and their White and certain Asian American counterparts" (p. 68). Gay (2000) argues that to be a culturally responsive teacher, knowledge of cultural diversity is paramount in meeting the needs of ethnically diverse students. Gay explains the need for developing a cultural diversity knowledge base, designing culturally relevant curricula, demonstrating cultural caring and building a learning community, cross-cultural communication, and cultural congruity in classroom instruction (2002).

## Culturally Relevant Pedagogy

Culturally relevant pedagogy (CRP), Ladson-Billings (1995) explains, evolved out of CRT. According to Ladson-Billings (1995), "Culturally relevant pedagogy (CRP) is a theoretical model that not only addresses student achievement but also helps students to accept and affirm their cultural identity while developing critical perspectives that challenge inequities that schools (and other institutions) perpetuate" (p. 469). Culturally relevant pedagogy ties in directly with developmentally appropriate practice (DAP) for young children. DAP includes knowing what is important culturally for children, and cultural development for the child includes, their family history, structure, and community (NAEYC, 2016). In CRP, teachers foster social relationships to achieve student success, cultural competence, and critical consciousness by sustaining fluid student-teacher interactions, showing a connectedness with all students, facilitating a community of learners, and helping students to learn together and be responsible for each other (Ladson-Billings, 1995).

## Culturally Sustaining Pedagogy

Paris and Alim (2014) built on the work of Ladson-Billings to create the theory of culturally sustaining pedagogy (CSP). According to Paris and Alim (2014) the two most important principles of CSP are:

> a focus on the plural and evolving nature of youth identity and cultural practices and a commitment to embracing youth culture's counterhegemonic potential while maintaining a clear-eyed critique of the ways in which youth culture can also reproduce systemic inequalities (p. 85).

Paris and Alim (2014) give a nod to Ladson-Billings and her work on CRP stating, "Indeed her concept of culturally relevant pedagogy has become ubiquitous in educational research circles and in teacher education programs." It comes full circle when Ladson-Billings (2014) in her "Remix" article refers to CSP, gives credit to Paris and Alim, and incorporates Hip Hop in her work with university students, an area Paris and Alim (2014) have explored extensively. Hip Hop was especially helpful in creating experiential learning through play math lessons using music, rhythm, and counting. Ladson-Billings realizes the impact her work has made and the evolution that will continue through CSP, and states, "Culturally sustaining pedagogy—will need to be a vigilant and steadfast project that guards against the degradation of the meaning and implementation of the term" (2014, p. 82).

**Equity of Access and Cultural Norms**

It is important to understand the history and evolution of CSP to understand how it relates to the problem of practice. The students to be affected by the intervention are a part of a Title I program. The majority are children of color who are in most cases from low-income households. I have learned from parents that often if the children are not given the play opportunities that I provide, they may not receive these opportunities at all. One of my goals as the researcher was to provide equal opportunity or equity of access to differentiated experiential play activities and culturally enriching resources that these students may not otherwise experience. Howard (2010) explains that part of being a culturally responsive teacher is getting to know the students, families, and communities and trying to gain an understanding of their cultures. One of the ways that our child development program promotes culturally responsive pedagogy is by working to build

relationships with families. Typically, we begin each year by conducting home visits with each child and their family. This was not possible during the pandemic. During this year we visited families virtually with the same goals in mind. One of the goals is to build connections and establish partnerships with families letting them know that we care and want them to be a part of their child's education. Through these partnerships I have also learned and gained an understanding and respect for the students' cultural norms and learned what is and is not considered acceptable to the families of each individual student.

## Related Research

The following studies were selected because they are similar in nature to my study. The studies address mathematical learning through play, comparisons of educator versus play-based approaches to learning, and teacher/child perspectives of learning through play. Following the related research studies, a discussion will be provided for the relationship of this study to previous research studies.

### Mathematical Learning

Park, Chae, and Boyd (2008) conducted a qualitative study on block play as it relates to mathematical learning. The purpose of this study was to investigate young children's mathematical engagement in play with wooden unit blocks that could provide a foundation for advanced mathematical learning. The study was based on task interviews with two boys, ages 6 and 7 both from low-income families. Before interviewing the boys, the researchers provided a two-hour session for the two boys to have free play with the wooden unit blocks. The tasks developed for the children were to fill outlined diagrams with blocks. The first finding indicated that children categorized

block pieces according to their shapes. The second finding suggested that children composed the same shapes with smaller block pieces. The third finding indicated that children were able to manipulate the blocks to compose a desired shape. The study showed that block play presents an opportunity for young children to learn complex mathematical concepts in place of the more traditional mathematics lessons, such as paper-pencil tasks and worksheet exercises. The study was of importance to me because similar mathematical tasks were to be implemented with the participants in the current study who also come from low-income families. However, the block play tasks were modified to include more free play for constructing knowledge of mathematical concepts. Whenever possible, I facilitated conversations to make the learning culturally relevant for the students.

Otsuka and Jay (2017) presented a qualitative study on block play and the association it has with the development of abstract thinking. The purpose of the study was to explore some of the ways in which the development of abstract thinking in preschool children is visible in play. The study was conducted in one classroom of 30 children from mixed cultural backgrounds. The video observation of the children took place during a free-play time when children were accessing the block area freely to start their own play or were invited to join an activity initiated by the researcher. The researcher's role was to understand each child's intention, and to follow and support these intentions without disturbing the flow of play. The researchers found that when young children observe other children, they memorize and imitate any features that interest them. Through the act of imitation, children internalize various concepts that help them to understand the world around them. The research also identified the importance

of a pause for reflection in young children, as a feature that may suggest the development of abstract thinking. This finding contrasts with the developmental stages of Piaget (1952) that suggest abstract thinking would not be possible at such a young age.

Ramani, Siegler, and Hitti, (2012) conducted a quantitative study using number board games in a Head Start classroom. The purpose of this study was to examine whether a theoretically based number board game could be translated into a practical classroom activity to improve Head Start children's numerical knowledge. The research project compared two experiments. In one experiment the children played the games one-on-one with and adult. In the other experiment children played the games with peers. Children were presented four tasks—counting, number line estimation, numerical magnitude comparison, and number identification—in the same order on the pre-test and post-test. The findings show that children learn from playing the game in small groups, just as they do from playing the game one-on-one with an adult. The results showed that playing a number board game as a small group learning activity promoted low-income children's number line estimation, magnitude comparison, numeral identification, and counting. Overall, the positive benefits and greater efficiency of playing the game with peers suggests that these small group activities can be useful in classrooms. These findings correlated to the participants in the current study who are from low-income families.

Vogt et al. (2018) conducted a play-based study to explore learning outcomes for young children using mathematics. The purpose of this study was to examine the effects on mathematical competencies using two different approaches: an instructional educator-led approach based on training programs and a play-based approach. The research

project compared two intervention groups, a guided play-based intervention using card and board games and a training program. These interventions occurred alongside a control group in a pre- post-test quasi-experimental design based on measures of children's mathematical competencies. The two interventions needed to be as comparable as possible regarding content and intervention time. The results indicate higher learning gains overall for the play-based approach. Differentiated effects were found as tendencies: children with low competencies tend to gain more from training programs compared to no intervention; children with high competencies gain more from the play-based approach than the training. Educators evaluated the play-based intervention with card and board games as better suited to children's diverse needs. The findings of this study were of particular interest to me because I provided instructor-led as well as a play-based supplement to mathematical instruction.

**Teacher/Child Perspectives on Play**

Kemple, Oh, and Porter (2015) demonstrate the value of play through teacher education. The purpose of this study was to document and analyze what happens when an experiential play lab is implemented in an early childhood teacher education program. The study included multiple forms of data collection, including two forms of reflective writings and group discussions. After the study, preservice teachers made a greater number of references to play in defense of developmentally appropriate practice, and the nature of their references to play increased in their focus on the process of play and on teacher roles in children's play, as compared to prior to the study. The results of this study of an experiential play intervention support the potential for documenting, and enriching these students' understanding of the importance of providing and supporting

play in classrooms for young children. As was the case in this study, education about the benefits of play is the key, and it is my responsibility to educate stakeholders of these benefits.

Colliver and Fleer (2016) in their study provide children's perspectives on play. The purpose of this study was to dispel the pervasive belief that children do not understand learning and examine children's perspectives on what they believe they are learning through play. A case study was conducted on 28 children ranging in age between two and five years old to discern what they believed they were learning through play. There were 772 comments on learning in 683 episodes of play that were analyzed using cultural–historical theory, revealing how children as young as two are authorities on their own learning. The findings challenge the prevailing assumption that young children cannot understand their own learning. Children's comments about their learning through play were unintelligible using an acquisition model of learning and a developmental view of play, but by using a holistic model to analyze the children's responses, and a cultural–historical view of play, it was possible to see that children were learning all the rules they believed were associated with play. The study shows that children know far more than they are given credit for knowing and often more than one model must be used to determine that knowledge.

These studies all address play and the benefits that play provides for young children and their education. The one consistent thread throughout these studies is that learning through play has a positive impact on young children. My study provided experiential learning through play as a supplement to an existing curriculum and differentiated instruction so that the needs of all learners were met.

## Relationship to the Current Study

There are many studies that have investigated aspects of play and the influences play has on children. However, few studies have investigated experiential learning through play in concert with traditional methods of instruction. The current study used experiential learning through play as a supplement to traditional methods of instruction for students. The students were interviewed to learn their attitudes about the play-based activities provided. Stakeholders were surveyed to learn their attitudes/perspectives on the value of play in early childhood education. This research also addressed the research gap that exists between attitudes toward traditional instruction and what is possible when that instruction is supplemented with experiential learning through play.

## Summary

A formal definition of play was explained as well as support for play as an important part of early childhood education. The purpose of the review was supported and described as an ongoing process that transpired throughout the research process. In addition, the literature research process, and methods for obtaining information have been clarified. The importance of play including play and the curriculum, the necessity for play, developmentally appropriate practice, and theoretical views of play were discussed. All these components were explored in relation to the problem of practice (PoP).

The theories and theorists who support them including progressivism, constructivism, social constructivism, and the salient principles of developmentally appropriate practice are all intertwined to support play at the center of the curriculum. I have explained the importance of social justice in early childhood education and the use of an anti-bias curriculum. In addition, the evolution of culturally responsive teaching,

culturally relevant pedagogy, and culturally sustaining pedagogy are related to the PoP with the use of a culturally relevant curriculum that was used during the research process.

I have introduced six different research studies that relate to the PoP. The first two studies explained mathematical learning through block play. The next two studies explained the mathematical learning that occurs through playing games, and the last two studies explored the perspectives of teachers/children on what can be learned through play. I concluded this review by explaining the relationship between the studies examined and the current research study. I also noted how this study addresses the gap that exists in the research.

## Chapter 3: Methodology

This dissertation in practice (DiP) is based on the premise that play is an integral part of early childhood education. As introduced in Chapter 1, the problem of practice (PoP) is that students are not given enough differentiated opportunities for experiential learning through play, and as a result many are struggling academically or not performing to the best of their abilities.

Constructivism is the focus of this research study as it relates to play and the theories of Jean Piaget, John Dewey, and Lev Vygotsky. The constructivist approach gives children the autonomy to explore, discover, and make meaning out of their play (Piaget, 1952). Dewey (1938) proposed that children need to construct learning through questioning and real-world experiences. Vygotsky (1978) explains that learning is social, and students need to be able to converse during play to make meaning and gain understanding of their surroundings.

In addition, Gloria Ladson-Billings' (1995) theory of culturally relevant pedagogy (CRP) was addressed in relation to students' cultural identities and to challenge inequities that exist within the educational system. CRP stems from culturally responsive teaching which is meant to bridge the gap between home and school (Ladson-Billing, 1995). Hammond (2015) suggests any lesson can be made culturally responsive by employing games, making the learning social, and creating a narrative or talking about the learning. All these methods were employed in this study with students.

The purpose of this study was to determine the impact on students learning mathematical concepts by supplementing a scripted curriculum with differentiated experiential learning through play activities. I also sought to learn stakeholders' attitudes or perspectives on the value of play in early childhood education. Stakeholders included early childhood teachers, administrators, parents, and the students themselves.

The study explored the following research questions:

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?
2. How does providing experiential learning through play impact students' attitudes toward math?
3. How does providing experiential learning through play impact students' academic achievement in math?

This chapter describes the proposed research methodology for answering the research questions over the course of the study in my prekindergarten classroom. It provides an explanation for the research design, description of setting and participants, data collection instruments and procedures, data analysis methods, validity and trustworthiness, ethical considerations, and a brief summary of the chapter.

## Research Design

Based upon the context of this study, an action research mixed methods design was adopted. A qualitative or quantitative design could not adequately answer the research questions for this study, and action research was chosen because I needed to be involved in every aspect of the research process (Creswell & Creswell, 2018; Creswell & Plano Clark, 2018; Efron & Ravid, 2013).

Action research is based upon the inquiries of an educator to advance the educator's practice and improve the academic achievement of students (Efron & Ravid, 2013). By using action research, the educator can see real results that directly benefit the students in the study. In addition, Herr and Anderson (2015) describe action research as a reflective process conducted both systematically and deliberately, which required me to include evidence to support my claims. As the researcher, I understand that although action research is a cyclical and self-reflective process, the plan may require revision, adaptation, and modification to account for unexpected circumstances (Efron & Ravid, 2013). Efron and Ravid (2013) list six steps in the cycle for carrying out an action research study:

(1) Identify a problem

(2) Gather background information

(3) Design the study

(4) Collect data

(5) Analyze and interpret data

(6) Implement and share the findings (p. 8).

Action research was chosen as the approach for this study as an alternative to traditional research which has different goals. The primary goals of traditional educational research are to develop ubiquitous theories, determine broadly applied principles, and develop strategies to advance the quality of education (Efron & Ravid, 2013). The objective of action research is for changes to take place within the research setting, in the classroom participants themselves, and/or in the researcher of the study (Herr & Anderson, 2015). Although the goal of this action research study was to make

educational improvements, these improvements may not be generalizable to other settings.

Action research is a collaborative process, and as a researcher, my acts and practices also affect collaborators as well as stakeholders involved in the study (Herr & Anderson, 2015). This fact also means that relationships of trust must be established to get honest feedback and support for this research process (Herr & Anderson, 2015).

Creswell and Creswell (2018) argue that by using a mixed methods approach integration of both quantitative and qualitative data will yield more insight than using one method alone. It is my contention that a quantitative or qualitative approach alone would not have been sufficient to answer the study's research questions. Qualitative methods were most appropriate for answering the first and second research questions that addressed the attitudes of adults and students. Quantitative methods were most appropriate for answering the third research question related to students' scholastic achievement and was based on numerical test scores. My contention is further supported by Creswell and Plano Clark (2018), who describe the characteristics of mixed methods research as the collection of both qualitative and quantitative data collected by the researcher to address the research questions, integrate the data and results, organize the procedures into specific research designs, and enact these procedures in accordance with theory and philosophy. The qualitative and quantitative methods were complementary and allowed for comparisons of perspectives in concert with numerical data.

**Setting**

Dendrite Elementary School is a suburban school located in the Southeastern United States. The school is comprised of grades prekindergarten through fifth and has a

student population of 656 children (SCDE, 2019c). A large percentage of the student population is minority (90.4%) and primarily people of color. The demographics are as follows: 2 American Indian, 21 Asian, 483 Black or African American, 63 White, 47 Hispanic or Latino, 0 Hawaiian or other Pacific Islander, and 40 students of two or more races (SCDE, 2019c). Of these children, 50.15% receive free or reduced lunch (SCDE, 2019d). For the 2020-2021 school year, the school's overall state rating was *average* (SCDE, 2020f). In my classroom, there were 18 students, 9 identifying as female and 9 identifying as male, and 15 of the 18 are African American. The setting and students who were a part of this research study will be referenced using pseudonyms for identity protection purposes.

**Intervention**

The intervention was the addition to the scripted math curriculum of differentiated experiential play-based activities. The attitudes or perspectives of the stakeholders were determined through a questionnaire on the value of play in early childhood education. The attitudes of the students were determined through interviews with the students who received supplemental support through play-based activities. I discovered the effects of the play-based activities on the students' scholastic development through a pre- and post-test. My goal was to determine whether there are benefits that experiential learning through play can provide for the students.

**Positionality**

As the teacher/participant researcher in the study, I am a White male teacher with 16 years teaching experience in early childhood education. I have received training for implementing the Eureka mathematical curriculum, and during the study was teaching the

curriculum for the third year. This study was of great importance to me both personally and professionally. I believe that incorporating play in the curriculum is the correct course of action; however, as Efron and Ravid (2013) have explained, as a researcher, I had to recognize and manage my own subjectivity and biases so that my positionality would not influence the research.

Over the course of my teaching career, I have had the opportunity to see what is possible when students learn through developmentally appropriate play-based activities that allow students to construct learning and meaning through play. When students are allowed to use their imaginations, they are able to go far beyond the expectations of the teacher. For example, I have seen students enact play scenarios on their own that have extremely complex plots. To an untrained observer, their play may look like chaos. However, I have observed that when students have constructed a vision for their play and it is analyzed, the students are able to explain what they are doing, why they are doing it, and the role of all participants in the play scenario. Students use their imaginations to construct real or imagined creatures, which can develop reasoning as well as social skills. Students can also be creative in their mathematical abilities; for example, they may create conventional shapes or their own shapes and make up their own versions of how numbers work both conventionally and unconventionally. There is no limit to what can be accomplished when children are able to use their imaginations. This type of learning is best practice for young children and is based on the theories of Jean Piaget, John Dewey, and Lev Vygotsky, who believed that learning should be based in play for children (as cited in Mooney, 2000).

As an individual, I have had the economic advantage of a middle-SES background as well as being White and male in our society. My background is in direct contrast to many of the Title I students I teach. It is my goal for the students I teach, regardless of their SES, race, or gender, to have every educational advantage possible. I believe experiential learning through play is best practice and the correct approach to success for all students. In many cases, I have seen prejudice and bigotry directed toward the very population I teach. It was my goal to have a positive effect as an educator through this research. Herr and Anderson (2015) explain that positionality refers to the researcher's relationship to his or her participants and setting. My advantages have positioned me to learn more about how to address issues of race and prejudice.

With respect to the continuum of Herr and Anderson (2015), as the researcher, I took on the role of both insider and outsider in relation to this research study. My role was not clearly defined or unidirectional. I took on the outsider role as a White male teaching primarily students of color. I also took on this role in relationship to the families of the students I teach. In peer collaboration, however, I took on the role of an insider with respect to other teachers, but as an outsider when working with administration. Regardless of my positionality, action research allows anyone to conduct research and by design is used by practitioners to improve their own educational settings (Efron & Ravid, 2013).

Since collaboration is a key component of action research (Herr & Anderson, 2015), I requested approval from my administrators concerning the implementation of my study to make sure I was following all guidelines and procedures for research studies conducted in our district. I also leaned on my academic team of teachers to help me in

forming questions for surveys and interviews as well as providing feedback on my study as it progressed (Herr & Anderson, 2015; Merriam & Tisdell, 2016). I asked stakeholders for input and suggestions as to how I might get the most responses to the surveys I presented. In addition, I asked parents to explain to me how I might get the most involvement from their children in the activities (Bredekamp & Copple, 2002). They shared with me what works at home when they work with their children and what does not (Van Hoorn et al., 2015). Parents also shared what they believe could be improvements to our educational process and my teaching practice, in addition to different ways I could include their child's culture in my classroom practices, which helped me to expand my cultural competence (Ladson-Billings, 1995; Nieto, 1999).

## Sample/Participants

Action research and a mixed methods approach were key in the selection of the participants for this study. In this case, the participants were my own students, and the goal was to examine whether play as learning could improve their mathematical prowess, no matter the level of the student. The mixed methods approach allowed me to accumulate and analyze information from both a qualitative and quantitative perspective (Creswell & Creswell, 2018). This approach also allowed me to triangulate the data to look for patterns, which may not have been possible using only one research method and added to the validity of the study (Creswell & Creswell, 2018).

As an action researcher with the goal of improving my own practice and the scholastic achievement of my own students, I used a convenience sample for this study (Efron & Ravid, 2013). There were 18 students in the class – 9 boys and 9 girls. The students were either four or five years old. Of the 18 students, 15 were African

American, 1 was of two or more races, and 2 were White. All students were included in the research process regardless of their initial test scores. The IRB suggested weaving the experiential learning through play activities for the study into the curriculum and did not expect or require parent/guardian consent or student assent for this study. Consequently, no students were excluded from participation in the study. Parents were informed about our experiential learning through play activities before the study began and the results at the conclusion of the study.

The students were a part of a Title I needs-based child development program, for which they qualified based on household income, number of parents in the home, and the Developmental Indicators for Assessment of Learning 4 (DIAL-4) screening. Students qualify based on developmental readiness, free- or reduced-price meal status or other risk factors (RTCFCD, 2020). According to the director of the program, "Other risk factors include the following: single parent home, educational level of the mother, and more than 4 children under the age of 18 in the home" (Q. Evans, personal communication, March 20, 2020).

Anonymous surveys were emailed to all my classroom parents for this year and the previous year, the early childhood educators in our child development program, and elementary school administrators in our district to collect as much data as possible and potentially gain more information than by surveying only one group. As noted in the email, participation and submission of the survey indicated consent.

Throughout this study, students were challenged to improve their mathematical skills through experiential play. The activities were constructivist in nature and when possible were reflective of the students' cultural backgrounds. Through student

participation, observation, assessment, and stakeholder input the research questions were sufficiently answered.

## Data Collection Timeline

The data collection procedures began in October 2020 and continued through February 2021 (see Table 3.1).

*Table 3.1 Data Collection Timeline*

| Proposed Date | Activity |
|---|---|
| April 2020 | I obtained permission from the IRB to conduct my study. |
| May 2020 | I obtained permission from the school district to conduct my study. |
| October 2020 | I conducted number naming and quantity comparison myIGDIs pre-assessments. |
| January 2021 | I began experiential play interventions with the students.<br>I conducted observations and semi-structured interviews with the students.<br>I surveyed stakeholders to determine their attitudes/perspectives on the value of play. |
| February 2021 | I conducted number naming and quantity comparison myIGDIs post-assessments. |
| March 2021 | I completed the compilation of data.<br>I completed the data analysis. |

## Data Collection and Instruments

Data were collected in this study using a variety of instruments including a survey, and an explanation of the survey was provided in the survey participation/consent letter (see Appendix B). The *Adult Perceptions of Play* survey (see Appendix C) was given to stakeholders to determine the level of importance they believe that play serves in

children's learning. Surveys are an efficient way to gather information about the participants' opinions and attitudes about a study (Merriam & Tisdell, 2016). The surveys were anonymous to give stakeholders more comfort in truly expressing their thoughts and feelings (Tourangeau, Rips, & Rasinski, 2000). Survey data were collected from participants through a Google Form that was set to collect data on a spreadsheet without identifying participants. The survey was eight questions long (a combination of multiple choice and short answer questions) followed by a section for stakeholders to add additional comments.

I conducted semi-structured interviews with students to learn their attitudes about the supplemental play-based activities that were provided (Merriam & Tisdell, 2016). The same six questions (see Appendix D) were asked of each student during the interview. The individual interviews were administered orally and took place following the play-based activities for in-person students. For virtual learners, the interviews were conducted via telephone. Survey and interview questions were developed by collaborating with peer educators. Data were also collected through teacher observation of the learning through play activities. I recorded the activities and revisited the videos to transcribe data and to make sure I had not missed anything noteworthy. Parents of virtual students submitted videos of their children engaging in the provided play activities.

All students received mathematical instruction using the traditional canned curriculum. They were given pre-intervention tests that were the same as the post-intervention tests to determine their academic mathematical level. The myIGDIs (Individual Growth and Development Indicators) test is an early childhood education numeracy assessment that measures students in the following areas:

- Oral counting
- Quantity comparison
- Number naming
- 1-to-1 correspondence counting (MyIGDIs, 2020a, p. 1).

MyIGDIs is a set of growth assessments designed to monitor the growth and development of pre-K students. The test has been "scientifically validated for identifying children who are experiencing difficulties acquiring fundamental skills necessary for academic success, IGDIs can also be used to measure developmental gains and inform instructional needs of individual children" (MyIGDIs, 2020b, para. 2).

MyIGDIs has been approved by the state board of education for preschool programs in our state (SCDE, 2019e). The pre-test was used to learn students' abilities prior to the intervention. The post-test was the same as the initial pre-test. The post-test was used as a measure of scholastic achievement that had resulted after my introduction of experiential learning through play. For this study to be manageable, I selected two areas of focus in which students struggle the most: number identification and quantity comparison. While I did expect the other two areas of counting and one-to-one correspondence to be positively affected, the experiential learning through play activities were not geared toward these mathematical operations.

The data collection instruments in this study reflect an action research and mixed methods approach. Both qualitative and quantitative instruments were designed to address the problem of practice (PoP), sufficiently answer the research questions, and were supported by the study's theoretical framework.

## Research Procedures

In this section, the specific procedures involved in conducting the study are discussed including the approval process and my responsibilities as the researcher to make sure that all participants and their data were protected. In addition, the activities involved in the study's intervention are identified and clearly defined along with an explanation of why these specific activities were chosen.

After receiving IRB and district approval, the study was conducted following IRB suggestions that the intervention activities be interwoven into the curriculum. In carrying out the study, I consistently upheld my responsibility as the researcher to protect the participants, develop trust, and provide honesty in the research findings, while avoiding any impropriety that could taint the research (Creswell & Creswell, 2018; Merriam & Tisdell, 2016).

Trust was key in this research study. Pseudonyms were used for all student participants and data collected through surveys, interviews, observations, or testing was kept strictly confidential and securely stored in locked files and on password-protected computers. Results of this research were made available at the conclusion of the study and may be published or presented at seminars; however, the report(s) or presentation(s) will not include the names of any participants in the study.

For experiential play to be a social learning experience, conversations must take place not only between teachers and students, but also between students and other students (Vygotsky, 1978). This was possible for in-person learners; however, virtual learners had to rely on family members for these conversations. The goal for all students through these play-based activities was for them to learn based on their zone of proximal

development (ZPD) which is defined as follows: “The distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). In each of the planned interventions to increase the students’ scholastic achievement, conversations were a part of the experience. The conversations were also a part of the culturally relevant aspects of the study. Children were encouraged to have conversations about whatever they chose including their cultures. Students talked about their families and drew pictures of family members. They shared what they do at home and during their interactions with others. In addition, I was able to have conversations with parents about their cultures and what they value in the education of their children.

The experiential play activities included in the study were all constructivist in nature and differentiated dependent upon students’ mathematical abilities. Constructivist activities by their very nature involve students being the creators of their own learning (Piaget, 1952). Music and movement activities included counting songs that showed visual numbers for recognition and subitizing songs. The specific songs used for the study were from the Jack Hartmann Kids Music Channel (Hartmann, 2020). The songs were from different musical genres including pop, rap, hip hop, country, and rock and reflective of students’ cultural backgrounds an important aspect for students to see relevance in the learning (Nieto, 1999). The songs also provided movement or exercise for kinesthetic learners and videos for visual and auditory learners. Students process information in many ways, and I wanted to help them to understand the material no matter which intelligence may be their strength (Gardner, 1983). The songs were tiered

and allowed students to count, learn to write, and identify numbers from 0-10, 1-20, 1-100, and 1-120. There were also songs to address subitizing from 1-5, 1-10, and "Super-Fast." Table 3.2 provides a breakdown of the songs, genres, and learning goals.

*Table 3.2 Songs, Genres, and Learning Goals*

| **Song Names** | **Genre** | **Learning Goals** |
|---|---|---|
| "Let's Learn Our Numbers 0-10" | Pop | Write/Identify numbers from 0-10 |
| "Count to 10 with Our Friends" | Pop | Count/Identify numbers from 1-10 |
| "Count to 20 and Workout" | Country | Count/Identify numbers from 1-20 |
| "Count from 1 to 100 with DJ Count" | Hip Hop | Count/Identify numbers from 1-100 |
| "Cowboy Count" | Country | Count/Identify numbers from 1-100 |
| "Count to 120 Song" | Pop | Count/Identify numbers from 1-120 |
| "Subitize Rap" | Rap | Subitize from 1-5 |
| "Subitize Up to Five" | Pop | Subitize from 1-5 |
| "Subitize 'Super-Fast-5'" | Pop | Subitize from 1-5 |
| "Subitize Rock" | Rock | Subitize from 1-10 |
| "Subitize Country Style" | Country | Subitize from 1-10 |
| "Subitize 'Super-Fast-10'" | Pop | Subitize from 1-10 |

Piaget explains that children either assimilate or accommodate new schema into their intelligence repertoire (Piaget, 1985). In assimilating, children are acting upon the objects in their environment; accommodating means the objects in the environment are acting on the children (Piaget, 1985). In these activities, the students primarily acted upon the objects or manipulatives for learning.

Prior to the study, I recorded videos for the differentiated learning through play activities for the virtual learners. With the assistance of my granddaughter Caitlynn, I was able to provide guidance in the performance of the activities as Caitlynn provided a model from the standpoint of a more competent peer.

Students used markers to construct and identify numbers on dry erase boards (see Figure E.1) and challenged each other to identify the numbers. This learning through play activity was differentiated as well. Students who were struggling to identify numbers and write numbers benefited from modeling (Vygotsky, 1978). Students regardless of level enjoyed drawing and telling stories about what they created on the dry erase boards (Hammond, 2015).

Students worked with play dough to construct and identify numbers (see Figure E.2). This idea was based on "Roll-A-Dough Letters" developed by the educational resource company Learning Without Tears (LWT, 2020). This activity was also differentiated for lower and higher performing students. Lower performing students learned to identify single-digit numbers, and higher performing students were expected to construct numbers up to three digits. The students were shown how to roll the play dough into a hotdog shape and mold it to fit on top of number cards. Students also identified numbers during the activity.

Students were challenged to identify numbers by playing Bingo (see Figure E.3), also differentiated for lower and higher performing students. Consequently, all students benefitted by being challenged to identify unfamiliar numbers. When students were able to identify the unfamiliar numbers, they accommodated new information into their existing schema (Piaget, 1985). Students also played a version of Bingo that was created

with each cell represented with dots for subitizing (see Figure E.4). Students were challenged to identify amounts that were differentiated for lower and higher performing students, so all students benefitted by being challenged to subitize.

Students were challenged to subitize by playing with dice (see Figure E.5). Lower performing students worked with an adult to subitize with each rolling one die to determine who had the higher number. Higher performing students worked with an adult subitizing with each rolling two dice to determine who had the higher number.

In a similar manner, students were challenged to subitize using dominoes. The lower performing students worked with an adult to subitize each end of the domino and to determine which end was the higher amount. The higher performing students worked with an adult to subitize the complete number of dots on their domino and compared it to the adult's domino to determine who had a higher amount.

According to Dewey (1938) learning should be experiential to be significant. It was also the position of Dewey (1916) that children should be personally involved to bring significance to the learning. This was the case for this subitizing activity. Students were challenged to subitize by constructing their own manipulatives. In my original plan, students were going to be directed to place dot stickers on blocks to be used to subitize in block center. However, due to concerns about spreading the virus, each student was given their own set of index cards and stickers to make their own manipulatives (see Figure E.6). Lower performing students constructed subitizing cards from 1-6, and higher performing students constructed subitizing cards from 1-12.

The students were given guidance within their ZPD for these play activities. The students were able to construct their own learning, but with an adult serving in the role of

a more competent peer. To ensure students' safety due to COVID-19, they worked with an adult utilizing precautionary measures during interactions. In the classroom, I was able to observe, have conversations, and collect data relating to the thought processes the students used when engaged in the learning (Vygotsky, 1978). The data were collected through field notes while students were engaged in the learning activities, and the notes were coded later for easy retrieval and relevance (Merriam & Tisdell, 2016). In addition, video recordings were used for interviews and learning activities. The recordings were transcribed and coded for patterns of relevance and to triangulate evidence to add to the validity of the process (Herr & Anderson, 2015). As an action researcher, I was directly involved in all aspects of the research. The quality and quantity of data I collected was imperative in answering the research questions and maintaining trustworthiness (Merriam & Tisdell,2016)

There are countless mathematical play activities I could have used to extend the mathematical knowledge of the students; however, for the scope of this study the activities documented were limited to the previously described activities. In addition, many games that would entail some students winning and some students losing were not considered for this study. Some of the students are unable to emotionally handle losing in any way, shape, or form, which can lead to extreme temper tantrums. This is due to what Piaget (1932) referred to as the *egocentrism* of young children, which involves an individual being preoccupied with their own interests and seeing those interests as most important (Piaget, 1932). As a result, for this study, learning activities winners and losers were not selected.

## Analysis of Data

The analysis of data was also approached with an action research mixed methods design with the aim of improving my own practice and improving the achievement of my students (Efron & Ravid, 2013). Mixed methods were used because I was interested in collecting qualitative and quantitative data to sufficiently answer the research questions (Creswell & Creswell, 2018).

The first research question was answered through surveys of as many stakeholders as possible. The second research question was answered through interviews with students. Students were interviewed using a semi-structured interview process to learn what they believe is important regarding play and learning in the classroom. Data were coded by breaking the information down into cohesive emergent categories to simplify, to make meaning, and to better understand the information that was collected (Efron & Ravid, 2013; Herr & Anderson, 2015; Merriam & Tisdell, 2016). The third research question regarding the impact of learning through play on students' scholastic development was addressed using the data collected from the pre- and post-test data of the myIGDIs assessment and my observational data of the students engaged in experiential learning through play activities.

Qualitative data were collected from surveys of the stakeholders, and data were put into a Microsoft Excel spreadsheet and color coded by frequency for themes or patterns to determine the attitudes and perspectives of the stakeholders on the value of play in early childhood education. In addition, semi-structured interviews with students were also coded and analyzed to determine the attitudes of the students toward the experiential learning through play activities that were introduced.

Action research and a mixed methods approach allowed me to gain more insight into my teaching practice through the analysis of this data. By determining the attitudes and perspectives of all stakeholders involved in the study, I was able to learn what changes I can make to better facilitate learning for my students.

The quantitative data were collected for the students on the administered math assessments. The pre-test scores were subtracted from the post-test scores to calculate the difference in each student's score and to determine if gains or regressions had taken place. This information was used to determine if the experiential learning through play intervention was effective or ineffective in improving the mathematical scholastic achievement of these students.

To further analyze the data, descriptive statistics were used to calculate the measure of central tendency by finding the mean of both the pre-test and post-test scores. A *t*-test was also used to compare the mean scores from the pre-test and post-test. Fraenkel, Wallen, and Hyun (2015) explain, "The *t*-test for correlated means is used to compare the mean scores of the *same* group before and after a treatment of some sort is given, to see if any observed gain is significant, or when the research design involves two matched groups" (p. 236). Statistical software was used to calculate the *p*-value. The alpha significance level and the *p*-value determined if there was a significant statistical difference in the mean of the pre-test and post-test for the one selected group.

## Validity/Trustworthiness

Merriam and Tisdell (2016) explain internal validity as the degree to which the research findings are objectively and subjectively believable. The trustworthiness for the qualitative research conducted for the study was addressed through triangulation of data,

member checks of interviews, peer review, and clarification of researcher biases (Merriam & Tisdell, 2016). The trustworthiness of the quantitative research conducted for the study was addressed through a peer discussion of the validity and reliability of the data collection tools and possible threats to internal validity (Efron & Ravid, 2013). In the interpretation of the data in a mixed methods study, the qualitative findings can be used to interpret the quantitative results adding yet another layer of depth to the validity of the study (Creswell & Creswell, 2018; Creswell & Plano Clark, 2018). Perhaps the most important level of trustworthiness lies in the integrity of the researcher. As Merriam and Tisdell (2016) explain, trustworthiness is of major concern and depends mostly on the credibility of the researcher.

External validity or generalizability is not the goal for educators conducting action research; the concern is for addressing issues in the current setting (Efron & Ravid, 2013). Generalizability may be nonexistent, but this does not mean the study has no importance or value. There was value to be gained through professional growth and the potential to better understand my students (Efron & Ravid, 2013). The study was enlightening and relative to other potential research.

## Ethical Considerations

As the researcher, I gained approval from the Institutional Review Board (IRB) and school district before conducting the study. In addition, the IRB suggested weaving the experiential learning through play activities for the study into the curriculum as it would not require parent/guardian consent or student assent for this study. Moreover, I clearly explained the purpose of the study, voluntary participation in the surveys and interviews, and opportunity for participants to freely withdraw from the study at any

time. All students chose to participate in the activities, and all students were interviewed. As a result, all students had an opportunity to benefit from experiential learning through play. No participants were coerced during the process or should have been afraid of reprisals for noncompliance. Furthermore, the safety of no participants was jeopardized through the interventions conducted during this study.

Herr and Anderson (2015) contend ethical decisions are pervasive in every facet of action research. This is certainly true and was of the utmost importance in this research study. All data of participants were confidentially obtained and stored. Participants are referred to only using pseudonyms, and privacy was maintained throughout the research process. Data were accurately reported and shared whether positive or negative results were the case.

## Summary

This chapter reminded readers of my problem of practice and the theoretical framework supporting my study. Action and mixed methods research were thoroughly explained along with the reasoning for their use in this study. The description of the demographics and setting gave context for the study. The intervention was described including a description of the instruments to be used to collect the data to answer the research questions. In addition, the variables used in the study were explained in relation to the study and the metrics that were used to collect data. A full description of the sample/participants was given, including the positionality of the researcher. A data collection timeline was provided to track the data collected over the course of the entire study. Data collection and instruments were explained, including a description of the tests to be administered. The procedures for the research process were explained so other

researchers may replicate the study. In addition, trustworthiness and ethical considerations were discussed. The means for analyzing the quantitative and qualitative data were also discussed in connection with this action research mixed methods study.

## Chapter 4: Results

Play is essential in the development of young children and should be the cornerstone of any child development program ((Nolan & Paatsch, 2018; Watchman & Spencer-Cavaliere 2017). In addition, play is a necessity for children's cognitive, social, emotional, language, and physical development (Copple & Bredekamp, 2018). The problem of practice (PoP) addressed in this study was that students are not given enough differentiated opportunities for experiential learning through play, and as a result many are struggling academically or not performing to the best of their ability.

This study was conducted in a Title I prekindergarten classroom in an elementary school located in the southeastern United States. The classroom population consisted primarily of minority students. The purpose of this study was to determine the impact on students learning mathematical concepts by supplementing a scripted curriculum with differentiated experiential learning through play. The study also examined the attitudes of students who received the supplemental play-based support and the attitudes/ perspectives of stakeholders based on the value they place on play in early childhood education. Stakeholders included the following: parents, educators, and administrators. The study aimed to answer these research questions:

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?
2. How does providing experiential learning through play impact students' attitudes toward math?

3. How does providing experiential learning through play impact students' academic achievement in math?

Two theoretical frameworks supported the results of this study. Constructivism incorporates the theories of John Dewey (1916), Jean Piaget (1952), and Lev Vygotsky (1978). Dewey believed learning should be practical and proposed that children should solve real-world, hands-on problems instead of just having knowledge presented to them. Piaget proposed that children construct their own knowledge through play. Vygotsky focused on the social aspects of play and believed children benefit by having conversations with others during play. The differentiated experiential learning through play activities that were incorporated in the study are constructivist by design and include the influence of all three theorists.

The second framework relates to the social justice aspects of the study and includes the theory of culturally relevant pedagogy (CRP) developed by Gloria Ladson-Billings (1995). CRP was used to address students' cultural identities. CRP was referenced when designing and structuring the implementation of the differentiated experiential learning through play activities. CRP was also considered when designing the survey which gave stakeholders an opportunity to make comments on any educational aspect they deemed fit, including challenging the systemic educational inequities that exist.

Due to the COVID-19 pandemic, this study was delayed, and data collection methods were modified because students were receiving virtual instruction at various times. The first week all students were virtual learners. Beginning in week two, 13 students were learning virtually, and five were in-person. During week three, students

were given the option to return to school or remain virtual, and at this time one more student joined me in-person. Consequently, during this time parents were asked to collect video evidence of the differentiated experiential learning through play activities for me to view and analyze. Beginning in week three, students were no longer required to submit video evidence for attendance but were required only to attend the morning meeting each day to be counted as present. However, parents continued their support and submitted videos each week of the study.

An action research mixed methods approach was implemented for this study. Action research is conducted by educators in their own learning environment to improve their teaching practice and improve students' learning (Efron & Ravid, 2013). A mixed methods approach was taken to use the strength of quantitative and qualitative research. A mixed methods approach was appropriate because a quantitative or qualitative approach did not specifically address all necessary questions and concerns.

In this chapter, I provide an explanation of the data collected to answer the research questions and my interpretation of the results. For this action research mixed methods study, the results were delineated appropriately as quantitative and qualitative for each research question. Tables, graphs, and charts show the data broken down for ease of interpretation. Big picture findings that informed my understanding of the results have been provided, followed by an analysis and a discussion of the data, and a chapter summary.

## Data Presentation and Interpretation

The data were presented by research question with my interpretations. The interpretations were based on the qualitative and quantitative data that were collected.

Prevalent themes were presented along with tables and graphs to provide clarity in the interpretation of the data. The perspectives/attitudes of the stakeholders (parents, educators, and administrators) who were surveyed are provided, followed by the perspectives/attitudes of the students who were interviewed, and the results of the students' test scores and their implications.

**Stakeholder Survey Data**

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?

The *Adult Perceptions of Play* survey to learn the attitudes/perspectives of the stakeholders on the value of play in early childhood education involved the collection of quantitative and qualitative data. The survey was conducted via email using a Google form and included eight survey questions:

Three questions were multiple choice, asking the participant's role (parent/guardian, educator, or administrator), how they rated the importance of play (*extremely important; reasonably important; not very important)*, and their view of how much time prekindergartners should have to learn through play (*more, less, or just the right amount of time*). Five questions were open-ended, providing participants opportunities to share their thoughts on how children respond to play in addition to perspectives on their own childhood experiences with play. Moreover, participants were given an opportunity to explain how schools could improve play opportunities for students. They were also given the chance to voice any additional comments or concerns.

The respondents were able to remain completely anonymous because no personal information was collected. The only identifier was the first question asking if the survey

participant was a parent, educator, or administrator. As an action researcher, I was primarily concerned with the stakeholders who directly affect my students and consequently my practice. Because this was the case, the sample size was purposely small. Those surveyed included parents from my class this year and last year, educators in my child development program, and elementary school administrators in the district. Of those who responded to the survey, 14 (23%) were parents, 37 (60.7%) were educators, and 10 (16.4%) were administrators (see Figure 4.1).

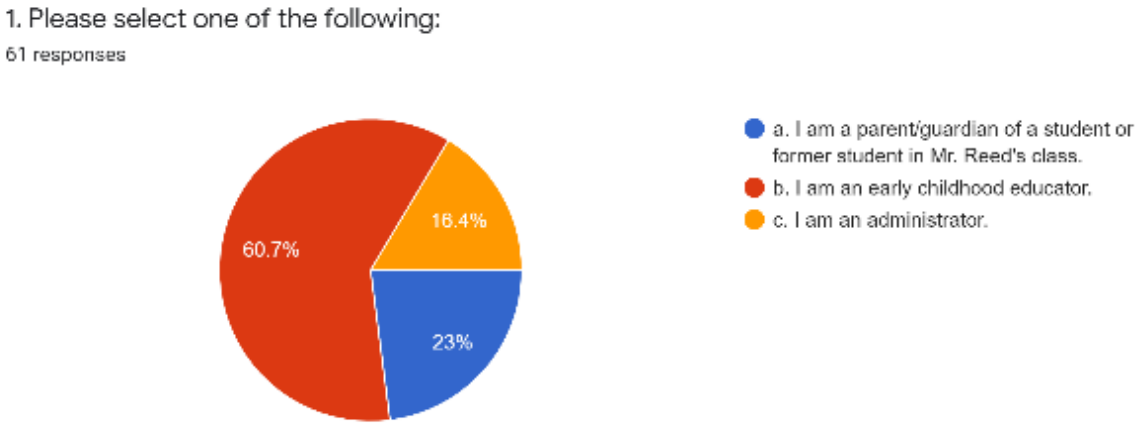


*Figure 4.1 Survey Respondents*

For consistency and clarity, survey questions and responses worded for multiple audiences (e.g., *child/students has/have*) will be worded in the plural (e.g., *students have*). Respondents to the survey in Question 2 were asked how important they believe play is for their students. Out of the 61 responses, no one responded that play is *not very important*, and 54 (88.5%) said play *is extremely important.* Of the 54, there were 12 (85.7%) parents, 34 (91.9%) educators, and 8 (80%) administrators. Only 7 (11.5%)

respondents indicated play is *reasonably important*. Of the seven, there were two (14.3%) parents, three educators (8.1%), and two (20%) administrators (see Figure 4.2).

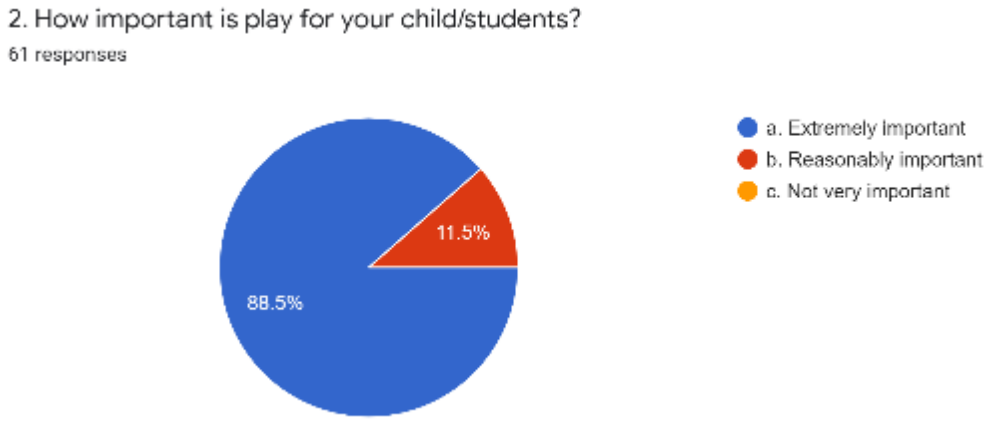


*Figure 4.2 Importance of Play*

In Question 8 survey participants were asked whether they believe prekindergarten students should have *more, less, or have just the right amount of time to learn through play*. Of the 61 participants, no one responded that prekindergarten students *should have less time to learn through play*, 30 (49.2%) believe prekindergarten students *have just the right amount of time to learn through play*, and 31 (50.8%) believe prekindergarten students *should have more time to learn through play*. There were four (28.6%) parents, 23 (62.2%) educators, and four (40%) administrators who believe students should have more time to learn through play. There were 10 (71.4%) parents, 14 (37.8%) educators, and six (60%) administrators who believe students have just the right amount of time to learn through play (see Figure 4.3).

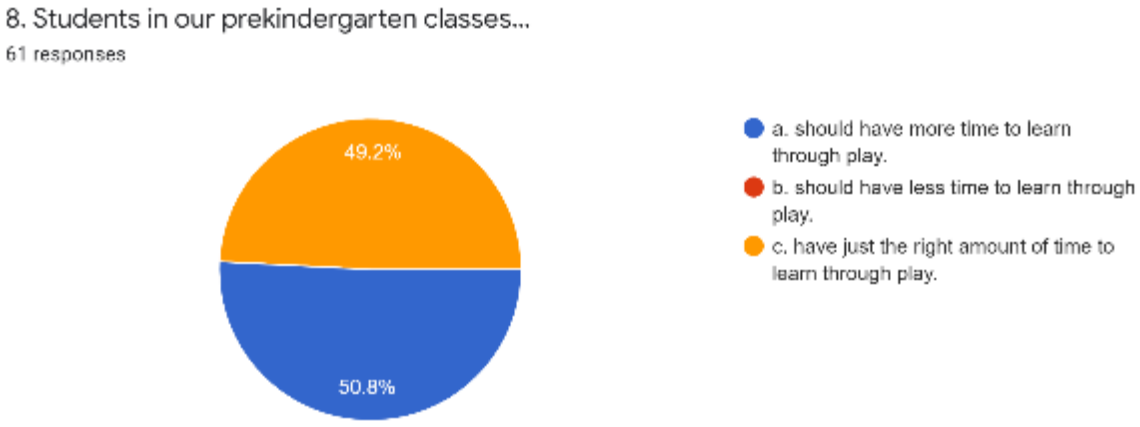


*Figure 4.3 Amount of Time to Learn through Play*

The remaining five survey questions were qualitative in nature. While the questions may have allowed for an affirmative or negative response, the questions also provided an opportunity for participants to elaborate on their answers.

In Question 3 participants were asked how much their students enjoy their play activities at school. There was one *N/A* response from an educator who may have no in-person students and a response from a parent stating, "He isn't going on campus but I'm sure he would love it." There were no negative responses. However, this is a very different year for children trying to connect through play while socially distancing if they are coming to school and even more so if they are virtual learners. All 14 of the parent responses included indications that their child enjoys play, and five specifically mentioned play activities at school. One parent explained that their child is even "more attentive" to lessons when involved in play activities at school. All educators indicated that their students enjoy the play activities at school. Of the early childhood educators' responses, 18 specifically mentioned how much their students learn through play and

enjoy center time, the manipulatives, and recess. One educator stated the importance of play because of the opportunities for the students to be "creative, imaginative, and express themselves." Another educator indicated that this is a "very different year" for students as far as play at school. Still another educator expressed, "They miss being able to have close contact play." All responses from administrators were positive stating that their students very much enjoy play, and it is the "highlight" or favorite part of their day. One administrator explained, "They enjoy recess to the fullest. Young children love to interact and imagine at recess."

Question 4 asked stakeholders to remember the types of play activities they were involved in as a child both at home and at school. The participants surveyed mentioned outdoor play in 69% of their responses. Outdoor games included Red Rover, kick the can, hide-and-seek, chase, tag, freeze tag, made up games, hopscotch, tug-of-war, kickball/sports. Kickball/sports was mentioned the most with 14 participants specifically identifying these games. Outdoor activities included riding bikes, swings, slides, jumping rope, making mud pies, playing with the big parachute, and playing on the playground. Riding bikes was the most prevalent outdoor activity identified by four participants. Stakeholders were more specific with the outdoor games identified. Only 24 respondents mentioned engaging in indoor play or play activities. However, these respondents all identified multiple activities. Indoor play and play activities at school included centers, blocks, baby dolls, music and movement, musical instruments, dancing, board games, puzzles, dress-up, puppets, kitchen, housekeeping, playing school, imaginative and cooperative play, drawing and coloring, art, making crafts, building things and computer games. The most prevalent indoor activity was housekeeping center

with 11 responses and a close second with seven responses was playing with Barbie/baby dolls. Parents, educators, and administrators mostly remembered playing during the prekindergarten years. One educator stated, "We played most of the day because you learn so much when you do."

Parents, educators, and administrators were asked in Question 5 if they felt they benefitted from their play experiences as a child and to explain what they learned or how these play experiences helped them develop as a child. All stakeholders indicated that they benefitted from their childhood play experiences. The benefits they listed included the following: creativity, imagination development, self-sufficiency, learning while having fun, development of social skills, motor skills, communication skills, social emotional skills, colors, shapes, letters, numbers, cooperation, sharing, problem solving, emotional intelligence, learning to build friendships, sportsmanship, taking turns and patience, fun, collaboration, empathy, physical fitness, an appreciation of nature and animals, and an ability to get along with others. Other responses given were derivations of these responses. Of these participants, 59% included the development of social skills as a part of their response. The most prevalent social skill identified was "getting along with others" mentioned by 20 different participants.

Question 6 (see Table 4.1) asked participants if they *believe their students have the same play opportunities at school/home as they did, and if the answer is no to provide an explanation*. Of the 14 parents, 10 (71.4%) responded *yes* and believe their child has the same opportunities at school/home as they did. The four (28.6%) parents who responded *no* explained that this was due to COVID-19 and the advancement of technology. Of the 10 administrators, seven (70%) believe their students have the same

opportunities at school/home as they did. For the three (30%) administrators who responded *no*, safety was an issue. In addition, it was stated, "Students today are being tasked with more academic activities at a younger age which is taking the place of free play." Of the 37 educators, nine (24.3%) believe their students have the same opportunities at school/home as they did. The 28 (75.7%) educators who responded *no* provided the following reasoning for their answers: COVID-19, little/no outside play, safety concerns, video games/technology, and the primary focus on academics. Educators provided the following explanations for their reasoning: Educators' explanations were mostly related due to limited time for play and creativity because "the focus is on testing and academics are prioritized." Responses supported one teacher's comment that "we have made Pre-K the new first grade," indicating that teachers were expected to emphasize "curriculum and assessments," "teach the skills," and have "more structured time." One child development educator explicitly stated, "Play is mostly adult directed instead of child directed, and play is not considered to be an important part of the early childhood curriculum."

*Table 4.1 Stakeholder Responses*

| **Question 6: Do you believe your students have the same play opportunities at school/home as you did?** | | |
|---|---|---|
| Stakeholders | Yes, opportunities are the same. | No, opportunities are not the same. |
| Parents (14) | 10 | 4 |
| Administrators (10) | 7 | 3 |
| Educators (37) | 9 | 28 |

In Question 7 stakeholders (parents, educators, administrators) were asked, if school could improve the play opportunities they offer, what types of things would you like to see and why? There were many prevalent themes in the responses provided. The word "more" occurred 44 times. Stakeholders indicated students need more of the following play opportunities: role play, opportunities for imaginative play, free play, unencumbered play time, collaborative play, organized play, school-wide play, materials to create their own play experiences without the teacher's help, hands-on play, problem-solving play opportunities, board games to learn math skills, and centers in all early childhood classrooms. Of the stakeholders' responses, the most prevalent was free or unencumbered play with eight responses. Not only did participants indicate that more play opportunities are needed, but 12 participant responses specifically explained that students need more "time to play." In addition, 15 stakeholders explained that more outside play opportunities are needed including nature explorations, swings on playgrounds, opportunities to play in the dirt and to learn about nature, safe playground areas with more space, and separate child development playgrounds. Moreover, another prevalent theme indicated specifically by early childhood educators was that more importance needs to be placed on learning through play than on a "book curriculum." One educator explained, "Children should have fun learning; play is how they learn." Of the respondents, seven believe no improvements are necessary or the school is providing ample play opportunities, and four did not know or had no response.

Parents, educators, and administrators were asked to provide any additional comments or concerns about play or any other educational inequities that they believe exist and should be addressed. Two parents commented, one to express appreciation for

the work we do as educators, and one to explain their perspective that "competition is healthy" in schools. Four administrators commented: two of the administrators explained the "barriers" that exist because parents have "very different views of play" which has an impact on students in the classroom. The other two administrators explained their belief that play is "extremely important" in the development of young children and that "work is play." The remaining 13 comments or concerns came from early childhood educators. There were two prevailing themes expressed by these educators. The first was the importance of play. One educator stated, "Early childhood education continues through second grade meaning they are still learning best through play and need more play experiences." The other prevailing theme was that there is "too much focus on curriculum and assessments in Pre-k." One educator commented, "By having less instruction for the younger groups (Pre-K-1) and more play, students can learn from each other and not be stressed about work/instruction all the time."

**Student Interview Qualitative Data**

2. How does providing experiential learning through play impact students' attitudes toward math?

The interview questions to learn the attitudes of the students concerning the experiential learning through play interventions, involved the collection of qualitative data. Interviews were conducted face-to-face with students experiencing in-person learning and via telephone or video conferencing for students learning from home. All students were learning from home during the first week of the study. The interviews consisted of six interview questions. Although the interviews were intended to be semi-

structured, during the interview process, students rarely expounded upon or gave elaborate answers that would have allowed for a less structured interview.

Two of the interview questions allowed only for an affirmative or negative response. These questions asked students if they enjoyed the math learning through play activity and if they would want to have this play activity again. The remaining four questions were open-ended and gave students the opportunity to provide their input on the play activities provided. These questions asked students what they liked or did not like about the activity, why they would want or not want to have this play activity again, what they learned, and why they need to know this information.

An attempt was made to interview the 18 students each week for six weeks—a total of 108 interviews. If students could not be contacted for an interview during a particular week, the student was interviewed twice the following week. There were no more than two weeks in a row involving a student who could not be contacted for an interview. The interviews for the final week of the study were conducted in-person for all students. All students agreed to come to the school for testing. Interviews were conducted for the final week of the study during this time and any interviews that had been missed during previous weeks were completed.

Student interview data was not merely symbolic. As an action researcher, I was concerned with the attitudes of my students regarding the math play activities provided. To improve my practice, I needed for my students to have a voice and ownership in the learning. In addition, the information allowed me to learn what students enjoy and do not enjoy about different learning activities. Moreover, it was important to understand what students believe they are learning or have learned because of the intervention.

Interviews were conducted for six weeks using the same interview questions for each week to determine the attitudes of students concerning the number naming or subitizing activities for that week. The first three weeks of the study involved number naming activities and the second three weeks included subitizing or quantity comparison activities. Each week different activities were provided that allowed for differentiation dependent upon students' skill levels. Video links were provided introducing the learning materials to the students learning from home. My granddaughter Caitlynn and I provided the video models for these play activities. I provided modeling for students learning in person.

One student had been identified but had not yet received services for speech. I can only understand affirmative and negative responses from this student. The rest of his speech is very difficult to understand and this student's answers to the interview questions requiring more than an affirmative or negative answer were not included. Another student is also being considered for speech services, but her speech is mostly understandable.

During the first week, students used dry erase boards and markers to write numbers. All students interviewed, except one, indicated that they enjoyed the activity. That one student explained, "Mom wouldn't let me." In subsequent weeks of the study this student was an in-person learner and participated in all activities. Excluding the student unable to participate, all other students except one stated they would like to have this play activity again. The one student believed the activity took too long. Those students who explained that they would like to have this activity again indicated it was because they "enjoyed it" and "It was fun." Other students indicated that they liked to

"count," "write," "draw," or "liked the snowman." One student recalled the snowman I made from the number eight in the introductory video to show the students how to have fun while learning.

No students indicated a dislike for the number writing activity. This would be a prevailing theme throughout the study. No students stated that they disliked any of the play activities presented. Well over half of the students responded that they liked using the pens and dry erase boards to write the numbers and to draw. Students also indicated that they liked "counting," "numbers," and that "it was good" meaning the number writing on the dry erase boards.

Students explained what they learned from this activity. Their responses were either "drawing," "writing," or "making numbers." Additional responses included "I learned about counting" and "to play and have fun." Students were also asked why they need to know what it is they believe they have learned. All responses included the words count, counting, number, or numbers. One student explained, "So you can grow up, go to school, and do the number stuff." Another student replied, "Counting, you have to count all the time. I usually try to count to 100, but I can't count to 100."

All students in each of the remaining five weeks of study responded with an affirmative answer when asked if they enjoyed the math learning through play experience provided. Answers for this question will not be repeated when addressing the subsequent weeks of interview data collected.

The second week, students worked with play dough and number cards. The play dough was rolled into a hotdog shape and molded to fit the individual numbers zero to

nine on the cards provided. This activity was differentiated to include numbers of more than one digit if a student needed more of a challenge.

Students indicated that they liked the play dough and number learning activity because it was "fun." In addition, students explained that they "love to play with play dough" including rolling out the dough and the fact that they could do the activity all by themselves. Students also responded that they liked "counting" and "making the numbers." All but two students replied that they would like to have this play activity again. One student explained, "I don't want to roll it out anymore." The other student said, "I'm done playing with it." Five students responded affirmatively but did not know why they wanted to have this play activity again. Students responded that they "liked" or "loved" the activity and that "it was fun." Additional reasons were because students liked numbers and counting, "I'm smart at it," and "Cause it's blue [play dough]."

Three students indicated that they did not know what they learned. The rest of the class's responses included either "numbers" or "counting." Additional comments for what was learned included "I love counting," "[I learned] to put them together," and "[I learned] how to make numbers." A theme that was present throughout the interviews each week was the fact that most students understood the purpose of the play activities was to learn about numbers and counting.

Three students explained they need to know what they learned from this activity to be able to "count money" and "I just need to know it because I need $100.00." One student responded, "Cause I'm a big girl now. Big girls know how to count because they're talented." Another student replied that they need to know this "Because Mom said so." Other responses included "to count" and "numbers."

The third week students played number bingo. Students were given multiple bingo cards. This activity could be differentiated by using the bingo cards that had larger or smaller numbers. Students could cover the numbers with the red circles provided or whatever they chose. They could also put the cards inside the provided sheet protector and use their dry erase marker to cross the numbers out.

Students indicated that they liked the various ways of covering up the numbers on the bingo cards, as indicated by many comments: “I liked covering the numbers up,” “I liked putting the circle thingies on the numbers,” and “I liked drawing X’s.” Students also stated that they liked finding and counting the numbers or that they “love bingo.” One student explained that she liked, “calling the numbers we don’t or do have.” Bingo was a play activity we could do as a group while remaining socially distant.

All students but one responded they would want to have this play activity again. The one student responded “No, not right now, but later.” He went on to explain the reason was “I already did it.” Two students indicated they did not know why they wanted to have this activity again. More than one-third of the students responded “It’s fun” as a reason. Students also indicated that they “like counting,” “love bingo,” or that bingo is their “favorite.” The remaining reasons were “to learn numbers,” “the red dots,” and “I’m smart.”

In response to what they learned through playing bingo, all students indicated either “numbers,” “to count,” or “counting.” Four students did not know why they need to know what they learned. One student stated, “So I can get $100.00.” Students were also concerned with being “smart.”

The fourth week of the study students worked on subitizing and quantity comparisons by playing dice bingo with similar materials, except the bingo cards had dice configurations. The cards were differentiated for varied skill levels of students. Students were also given dice to roll and to identify the amounts on the dice corresponding to the amounts on the bingo cards.

Students indicated what they liked about dice bingo. Students explained that they "like/love bingo" or "It is fun." In addition, students liked to roll the dice, to count, and to cover the numbers in various ways.

All students except one responded they would want to have this play activity again. The one student responded, "Not right now." He went on to explain the reason was "I don't want to right now, maybe later." Students' reasons for wanting the play activity again included "It was fun," "I liked it," and "I love bingo, it's my favorite." In addition, students liked working with numbers and "to roll the dice."

All students indicated that they either learned about numbers or counting from the dice bingo activity. Students then explained why they need to know numbers and to count. Students responded, "So I can get smart," "so I can get better with numbers," and "cause that's important." Students also gave various reasons for needing to know how to count: "I have to learn to count to 100 for the 100th day of school," "to count food so you don't eat too much," "I need to know how to count to '10,' [others said *100* or *1000*]," and "I need to count money—Ferrari."

The fifth week students used dice and dominoes for subitizing and quantity comparisons. The play activities could be differentiated by comparing the quantities on each of the two dice or both dice together. Students could be challenged to identify

amounts on one or both sides of the line separating the dots on the dominoes. Students could also play a simplified version of dominoes they were shown in the video link. The students indicated that they preferred rolling the dice with a slight edge over playing dominos (10:8). Students stated that they liked "working with," "counting," and "guessing numbers." Students also liked "rolling dice" and "counting/matching dots." Students also responded, "I liked to play with them" and "I liked the way you helped me."

All students but two responded they would want to have this play activity again. One student responded, "I'd love to, but not right now." He went on to explain the reason was he wanted "to play something else." The other student responded, "I don't know . . . I might want to play something else." Students' reasons for wanting the play activity again included variations of "it was fun," "I liked it," and "it's my favorite." In addition, students liked "counting," "learning," "matching them up," and "playing with them." This week had the most students responding that they would not want to have the play activity again and that was only two.

Students indicated from these play activities they learned "counting" or "how to count/match dots," "numbers," "good things," and "to roll dice and get better at dominoes." Students primarily responded that they need to know numbers "to count." Students were also concerned with learning and getting smart. "I need to learn everything," "I have to learn stuff," I need to know this "so I can get smart," and "so I can be great." Students also responded, "You have to use math in school," "so you have enough when you go to the store," and "to get $100.00." The mother of the student who

responded in multiple interviews “to get $100.00” stated, “I don’t know why, but he’s obsessed with getting $100.00.”

The sixth and final week of the study students created their own learning manipulatives with stickers and index cards. The students first drew a line down the middle of each index card and placed stickers on each side with no amount being the same on each side or more than six. The cards were then used to challenge students into deciding which amount was more on each card. The activity could be differentiated by comparing quantities on just one card or comparing quantities on two cards and by subitizing amounts.

Thirteen of the students indicated they either liked to put the stickers on the cards or liked to count the stickers. Two students did not know what they liked about the activity. The remaining three students referring to the cards with stickers stated, “I love playing with them.”

All students but one responded they would want to have this play activity again. This student responded *no* because “it was too much work.” Students’ indications for wanting the play activity again included “it was fun,” “I liked it,” and “it’s my favorite,” and some of their reasons were “just because,” and “because I’m smart.”

Students indicated that they learned about numbers or counting from the sticker card activity. In addition, students responded that they learned “to be fast,” “to put stickers on,” and “good things.” Students explained why they need to know what they learned from these activities: “so I can get smart,” “so I can get better and better,” and “it’s important.” Students explained that they want to know how to “be fast,” “to count” and “to learn their numbers.” One student said, “You need to be quick so you’re not

late," and another said, "So I can be faster than my big brother." Students' reasoning for learning about counting and numbers was also necessary "to learn how to count money" and "because you said so."

**Observation Data/Field Notes**

All students learning from home were provided a learning board in Google classroom designed by teachers in our pre-K program. This learning board explained and provided links for the assignments based on video recordings. A math time, alphabet time, and book time video recorded lesson was provided each day for students by the teacher in their classroom. Students were required to submit a video or picture of their work as designated on the learning board as evidence of their attendance each day. Students learning in person received their instruction via the teacher.

I was granted permission by our director to add my study assignments and video links to our learning board each week for my study. At the beginning of each week, I supplied a video link demonstrating and explaining how to use the materials I provided. My granddaughter served as a more competent peer example in the videos. I required virtual students to submit a video of their learning at the beginning and end of each week of the study. This was so that I could see the progress of each student and whether they were struggling, excelling, or somewhere in between. Each day, whether submitting a video or not, students were also supplied a link to a song relevant to the experiential learning through play activities for that week.

I provided instruction for in-person students concerning the experiential learning through play activities related to the study. I took field notes to monitor their progress, and they were also videoed at the beginning and end of each week. This was for me to be

able to ascertain areas where they were doing well or needed more help. In addition, this provided a record for me to be able to review and monitor students' progress.

I included students in the study who received in-person instruction or submitted videos for at least four of the six weeks. This included all 18 students in the class. Video submissions were extremely varied in terms of length. One student submitted videos each week that were more than 30 minutes long. The remaining students' videos were an average of three to five minutes. Quality rather than quantity was the key for video evidence. Some students were also much more cooperative with their parents in completing the assignments. Students overall showed progress in their numeracy skills as shown by the test score data. Students overall seemed to enjoy the activities provided based on their attitudes and perspectives as demonstrated during the study.

**Test Score Quantitative Data**

3. How does providing experiential learning through play impact students' academic achievement in math?

Prior to the implementation of the differentiated experiential learning through play intervention, all students were tested to learn their number-naming and quantity-comparison skill levels using the myIGDIs assessment. The same assessment was used as a post-test to learn if students' mathematical skill levels in the areas of number naming and quantity comparison had improved or declined (see Table 4.2 & 4.3). In addition, statistical analyses were used to determine if these levels were statistically significant.

To determine the impact the experiential learning through play intervention had on student' academic achievement a one-group pre-test/post-test design was implemented for the *myIGDIs Number Identification* assessment and the *myIGDIs Quantity*

*Comparison* assessment. For the *myIGDIs Number Identification* assessment students were required to identify as many numbers as possible (0-20) in one minute. A perfect score would be 63 out of 63. All students showed positive gains between their pre-test and post-test scores (see Table 4.2).

*Table 4.2 Number Identification (MyIGDIs)*

| Student | Pre-test Number Identification | Post-test Number Identification | Difference |
|---|---|---|---|
| Student A | 6 | 17 | +11 |
| Student B | 11 | 13 | +2 |
| Student C | 3 | 10 | +7 |
| Student D | 1 | 10 | +9 |
| Student E | 11 | 14 | +3 |
| Student F | 6 | 7 | +1 |
| Student G | 5 | 10 | +5 |
| Student H | 11 | 38 | +27 |
| Student I | 0 | 7 | +7 |
| Student J | 5 | 13 | +8 |
| Student K | 28 | 43 | +15 |
| Student L | 24 | 43 | +19 |
| Student M | 22 | 33 | +11 |
| Student N | 19 | 20 | +1 |
| Student O | 4 | 6 | +2 |
| Student P | 8 | 34 | +26 |
| Student Q | 1 | 4 | +3 |
| Student R | 3 | 13 | +10 |

For the *myIGDIs Quantity Comparison* assessment students were required to identify the greater of 2 quantities presented on each page of the assessment in one minute. A perfect score was 30 out of 30. All students but one showed positive gains between their pre-test and post-test scores (see Table 4.3). The student whose score did not increase had gotten 28 of 30 (93.33%) comparisons correct on the pre-test and made no improvement or decline in her post-test score.

*Table 4.3 Quantity Comparison (MyIGDIs)*

| Student | Pre-test Quantity Comparisons | Post-test Quantity Comparisons | Difference |
|---|---|---|---|
| Student A | 11 | 22 | +11 |
| Student B | 16 | 27 | +11 |
| Student C | 23 | 26 | +3 |
| Student D | 20 | 28 | +8 |
| Student E | 25 | 30 | +5 |
| Student F | 11 | 21 | +10 |
| Student G | 28 | 28 | 0 |
| Student H | 27 | 30 | +3 |
| Student I | 6 | 18 | +12 |
| Student J | 13 | 23 | +10 |
| Student K | 16 | 28 | +12 |
| Student L | 23 | 30 | +7 |
| Student M | 27 | 30 | +3 |
| Student N | 24 | 30 | +6 |
| Student O | 20 | 27 | +7 |
| Student P | 13 | 30 | +17 |
| Student Q | 19 | 24 | +5 |
| Student R | 22 | 24 | +2 |

Descriptive statistics were used to calculate mean scores for data analysis using the Minitab Express software (see Appendices G & H). A paired *t*-test compared the mean scores of the pre-test and post-test of the students and showed a T-Value of -4.94 for the *myIGDIs Number Identification* assessment and a T-Value of -7.06 for the *myIGDIs Quantity Comparison* assessment.

For the number identification assessment, the null hypothesis would state that there is no difference between a pre-test on number identification with no experiential learning through play intervention and a post-test on number identification with an experiential learning through play intervention. The p-value was 0.0001. As a result, the alternative hypothesis there is a difference is accepted and because the p-value was less than .05, the null hypothesis that there is no difference is rejected. The mean scores in

Table 4.4 support the alternative hypothesis, there is a difference with an experiential learning through play intervention (see also Appendix F).

*Table 4.4 Number Identification Pre-Test and Post-Test Results*

| Sample | N | Mean | SE Mean |
|---|---|---|---|
| Pre-Test | 18 | 9.333 | 1.998 |
| Post-Test | 18 | 18.611 | 3.128 |

For the quantity comparison assessment, the null hypothesis would state that there is no difference between a pre-test on quantity comparisons with no experiential learning through play intervention and a post-test on quantity comparisons with an experiential learning through play intervention. The p-value was less than 0.0001. As a result, the alternative hypothesis, there is a difference is accepted and because the p-value was less than .05, the null hypothesis that there is no difference is rejected. The mean scores in Table 4.5 support the alternative hypothesis, there is a difference with an experiential learning through play intervention (see also Appendix G).

*Table 4.5 Quantity Comparison Pre-Test and Post-Test Results*

| Sample | N | Mean | SE Mean |
|---|---|---|---|
| Pre-Test | 18 | 19.111 | 1.512 |
| Post-Test | 18 | 26.444 | 0.864 |

## General Findings/Results

The results of the data have been presented. I have provided my interpretation of the findings as they relate to the three research questions. In this section, information gleaned from the research questions will be considered as a whole to present an overall picture of the findings.

When considering the survey, interview, and statistical data together in this study, one major theme emerged—play had an impact on student learning. This was a resounding message conveyed by adults and children and supported by the data analysis.

No adults surveyed believed that play was unimportant. In addition, the consensus was that students enjoy their play activities. The adults believed that they benefitted from play in their own lives, and no one surveyed believed students should have less time to play.

Students indicated that they enjoyed the play activities presented during this study. Students were also able to convey what they liked about the activities and had sound reasoning as to whether they would like to have the play activity again. Students understood what they had learned although it was often difficult for them to convey why they needed to know the information.

Statistical analyses of the test data indicated that the play activities did have an impact on the students' learning. Although the video and observational data could not be statistically analyzed, students overall did show growth over the course of the study and the impact of that growth was reflected in the test score data.

The concept of play as a venue for learning not only had impacted adult participants in their own childhoods, but also many of the students interviewed when referring to play stated it perfectly, "It's fun."

## Analysis of Data Based on Research Questions

After a thorough examination of the data, I have analyzed the information based on the research questions for the study. The analysis of the compiled data is presented following each research question in this section. The first research question was

answered through collection of data from the surveys of stakeholders. Quantitative data were presented as percentages and qualitative data were analyzed and coded for patterns and themes. The second research question was answered through student interviews. Data were also coded categorically for themes and to make meaning of the information collected. The third research question was answered based on the data collected from the pre- and post-tests of the myIGDIs assessments, along with observational data. The pre-test scores were subtracted from the post-test scores to determine if progress or declines had taken place. Statistical means were calculated and compared to determine if any gains were statistically significant.

**Stakeholder Survey Data Analysis**

**For the first question,** *What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?,* positive attitudes or perspectives were the most prevalent on the survey among educators, followed by parents, and then administrators. Interestingly, none (0%) of the participants surveyed believe that *play is not important*. An overwhelming 88.5% of the stakeholders surveyed believe *play is extremely important*, and11.5% believe play is at least *reasonably important*. This information indicates that all the participants surveyed believe play has value in early childhood education. In addition, no participant surveyed believed students should have *less time to learn through play*, also indicating a pattern that the respondents believe play has value in early childhood education.

All survey participants indicated that their students *enjoy their play activities at school*. The information provided by these participants acknowledges that schools in our district are providing play activities that students find enjoyable. Stakeholders shared the

*types of play activities they were involved in as a child both at home and at school*, and over two-thirds of the responses involved play activities that occurred outside. Today, as expressed in the stakeholders' responses, many children do not play outside because of safety concerns and a preference for technology-based games. All participants indicated that they believe their play experiences helped them to develop as a child. The stakeholders' responses also indicate a prevailing theme that they value play and play experiences in the development of young children.

Of those surveyed, 71.4% of parents and 70% of administrators believe their *students have the same play opportunities at school/home* as they did. Paradoxically, educators' perspectives were almost polar opposites. Of the educators surveyed, 75.7% do not believe students have the same play opportunities as they had in childhood. The educators explained COVID-19 has had an impact and diminished play opportunities for students. In addition, educators further clarified, students often have little or no outside play at home due to safety concerns. Moreover, video games and technology reduce children's play opportunities. At school, play opportunities have been reduced due to a focus primarily on academics. The parents and administrators who responded *no* voiced the same concerns as the educators. Because no explanation was required for an affirmative answer one can only speculate as to reasons parents and administrators indicated in such high numbers about this belief.

Stakeholders explained many different variations of play opportunities that they would like to see schools provide including outside play activities. Educators provided a unique perspective explaining the need for students to have more emphasis on play than a standardized curriculum and the importance of having fun while learning. Stakeholders

were given the opportunity to express any additional comments or concerns. Only two parents commented, one to express appreciation and one to explain their perspective that "competition is healthy" in schools. Four administrators commented, two expressing concerns for the "barriers" that are present because of the varied views parents share on play which impacts students and two supporting play as "extremely important." The educators who commented either extolled the benefits of play or lamented that there is "too much focus on curriculum and assessments in Pre-k."

**Student Interview Data Analysis**

**Student responses to the second question,** *How does providing experiential learning through play impact students' attitudes toward math?*, indicated students' perspectives about their involvement in the study. Over the course of the six-week study, no student indicated that they did not enjoy the play-based activities provided. One hundred percent of students gave an affirmative response when asked if they enjoyed the activities. My students generally have positive attitudes, but it was surprising that all the students indicated that they enjoyed all the differentiated learning through play activities.

Overall, students in each week of the study understood and could explain what they liked about the number naming and quantity comparison activities. These interviews debunk the idea that young students do not know what they are learning or why they are learning it. Their responses were reasonable and pertinent to the questions being asked. Students' responses were genuine and gave me insight as an action researcher as to what students liked about different learning activities and specifically what aspects of the learning they enjoyed. This insight will give me the ability to make sure those components are present in future learning activities for my students.

During the six-week study, only eight students responded *no* to participating in a particular play activity again. All the responses were reasonable. One student believed the number writing activity "took a long time." The activity occurred at home for this student, and I am unaware how much time during the week was required of him to work with writing numbers. One student did not want to have the playdough and number identification activity again because she did not want to "roll it out anymore." This student was also a virtual learner during the study, and I am unaware how much time she was required to roll out the play dough. An in-person student responded, "I'm done playing with it." This student knows there are options and choices for learning in our classroom and opted for another activity. For the number bingo activity, one in-person student explained he wanted to play "not right now, but later" because "I already did it." It was not that the student did not enjoy the activity, but he wanted to have an opportunity to engage in other activities. This student gave the same answer and reasoning for the dice bingo activity and the dominoes/dice activities the following weeks. For the dominoes/dice activities another student (virtual learner) did not want to have the activity again because "I might want to play something else." The sticker/card activity was a lot of work and for one in-person student, she believed it was "too much work." All this information is valuable whether reactions are positive or negative as it helps me improve my practice.

The major prevailing theme in student responses each week as to why they would want to have the provided play activities again was that *it was fun*. The students were learning while having fun, and they knew it. Every activity may not have been a perfect

fit for every student; however, through observations and interactions, I was able to discern that students were progressing and having fun with the play activities provided.

Numbers and counting were given more than any other responses as to what students believed they had learned from the play activities. This information also provides insight that students do know what they are learning. Students were not always sure why they needed to learn this information, but they did know that it was "important," and they needed to know this information "to get smart." Students' answers made sense, but with a follow-up question as to why it was necessary for them to know things like how to count and numbers they usually did not know.

**Test Score Data Analysis**

**For the third question,** *How does providing experiential learning through play impact students' academic achievement in math?*, test scores were examined and analyzed. All students in the class were tested for both the pre- and post-tests. The students' *myIGDIs Number Identification* assessment showed an overall average increase in test scores of 99.41%. This increase indicated the impact experiential learning through play can have as an influence on students' math achievement. The students' *myIGDIs Quantity Comparison* assessment showed an overall average increase in test scores of 38.37%. In addition, six students achieved a perfect score of 30 out of 30. This increase also revealed the impact experiential learning through play had as an influence on students' math achievement.

The length of time between the pre-test (October) and the post-test (February) had a maturation effect. Due to COVID-19 it was not possible to formally assess students at any time other than during the program mandated testing windows. It could be argued

that the gains in number identification and quantity comparison scores were due primarily to the implementation of the Eureka Math curriculum. However, Eureka math only strives for students to identify numbers 0-10 and quantities up to five for comparison which correlates to the state standards. *MyIGDIs Number Identification* assessment requires students to identify numbers 0-20. The *myIGDIs Quantity Comparison* assessment has six as one of the quantities to be compared in 12 out of 30 of the comparison items to be tested. The incongruence between curriculum and assessment does not support positive outcomes. There should be identical requirements for curriculum and assessment to ensure students and teachers have an understanding of what is expected.

## Summary

In this chapter the problem of practice, research questions, and theoretical frameworks were reintroduced. An explanation for the revision of data collection methods due to the pandemic is provided. In addition, an explanation for the use of action research and mixed methods in this study is provided. Data were presented along with an interpretation of the data by research question. The *Adult Perceptions of Play* survey gave insight into parents, administrators, and educators impressions of play and the value of play in early childhood education. Student interviews revealed the attitudes of the students concerning the experiential learning through play intervention provided. An explanation of how data were collected from in-person and virtual learners through observation and field notes was provided. Test score data was presented and revealed the impact of experiential learning through play on students' academic achievement in math.

General findings were presented along with an analysis of the survey, interview, and test data based on the research questions.

## Chapter 5: Summary and Discussion

This action research study examined multiple perspectives about learning through play for early childhood students. Current educational practices in early childhood education stress less time learning through play and more time on academic-based curricula (Miller & Almon, 2009). Basing their conclusions on current expectations, Miller and Almon (2009) suggest that kindergarten is the "new first grade;" consequently, child development is the new kindergarten (p. 34). As a child development teacher for the last sixteen years, I have seen what is possible and the importance of play in the education of young children.

The problem of practice for this dissertation in practice is that students are not given enough differentiated opportunities for experiential learning through play, and as a result many are struggling academically or not performing to the best of their ability. Through this research process and the interventions employed, I have been able to study the academic impact of providing additional learning through play opportunities for my students. As a research project based in play and the way young children learn, constructivist ideals were prevalent throughout the study. Students were able to construct their own learning through hands-on activities while having conversations (Piaget, 1952; Dewey, 1916; Vygotsky, 1978). In addition, when constructing this study, students' cultures were considered along with the tenets of culturally relevant pedagogy (Ladson-Billings, 1995).

The purpose of this study was to determine the impact on students learning mathematical concepts by supplementing a scripted curriculum with differentiated experiential learning through play. The attitudes of students toward the experiential learning through play were learned through semi-structured interviews. In addition, the attitudes toward play of parents, teachers, and administrators were learned through surveys. This study was designed to answer the following research questions:

1. What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education?
2. How does providing experiential learning through play impact students' attitudes toward math?
3. How does providing experiential learning through play impact students' academic achievement in math?

**Summary of the Major Findings**

The research conducted did allow me to adequately answer the research questions and to collect data to address the findings. Data were collected through surveys, interviews, observations, field notes, video evidence, and standardized testing.

Through a survey, the attitudes/perspectives of the stakeholders (parents, educators, and administrators) on the value of play in early childhood education were discerned. All participants indicated that they at least consider play to be *reasonably important* (11.5%). The majority surveyed considered play to be *extremely important* (88.5%). The stakeholders indicated their belief that prekindergarten students either *have just the right amount of time to learn through play* (49.2%) or students *should have more time to learn through play* (50.8%). No one indicated students *should have less time to*

*learn through play*. Those surveyed were asked how much students enjoy their play activities at school. There were no negative responses. Stakeholders were asked to recall their childhood play activities. There were a wide variety of activities mentioned, and 69% of responses involved outdoor play. All survey participants acknowledged that they benefitted from childhood play experiences. The development of social skills "getting along with others" was the most prevalent response at 59%. The majority of parents (71.4%) and administrators (70%) believe students have the same play opportunities at school/home as they did. Paradoxically, 75% of educators do not believe students have the same play opportunities due to COVID-19, less outside play (safety), technology, and a major shift in focus to academics. Only 18% of the stakeholders either declined to answer or believe the school does not need to improve the play opportunities they provide. The other 82% believe the school does need to provide more play opportunities and more time to play. In addition, the comments and opinions stated following the question section of the survey provided additional insight on the importance of play for young children.

Students' attitudes toward math were discovered through interviews following the experiential learning through play opportunities. All students indicated that they enjoyed each of the play opportunities provided. Students were able to explain what they liked about the number naming and quantity comparison activities. Only eight students over the course of the six-week study opted not to participate in certain activities again and provided an explanation for their reasoning. Generally, students indicated that they had fun and enjoyed the learning through play activities. Overall, they understood that the activities were intended to help them learn about numbers and counting; however, in

many cases students were unable to articulate why learning this information was important.

A pre- and post-test was administered to all students in the class. The *myIGDIs Number Identification* post-test revealed an increase in test scores of 99.41%. The *myIGDIs Quantity Comparison* post-test indicated an increase in test scores of 38.37%. The increase in test scores indicates that experiential learning through play did have an impact on students' math achievement.

For this final chapter, the findings will be presented as they relate to the literature previously examined in Chapter 2 as well as new literature that has been discovered to be relevant during the research process. In addition, recommendations based on the findings and an actionable plan for implementing those findings will be discussed. Moreover, a reflection is provided on the research process in its entirety including limitations of the study, recommendations for future research, and an overall summary of the research process as it relates to the problem of practice.

## Results Related to Literature Review

The results of the study are consistent with the research findings and literature explored prior to the implementation of the differentiated experiential learning through play intervention. Children were able to construct learning through play (Dewey, 1938; Piaget, 1952; Montessori, 1909/1964). Students were also able to successfully work with a more competent peer/adult within their zone of proximal development and have meaningful conversations about their play (Vygotsky, 1978). Interviews with students also solidified the idea that children do understand the purpose of their play and what they are learning (Colliver & Fleer, 2016). The *Adult Perceptions of Play* survey results

indicated that play is valued by parents, teachers, and administrators in education. It also seems that the more adults are educated about play, the more likely they are to understand the benefits that play provides in the education of young children. This is consistent with the findings of Kemple, Oh, and Porter (2015). As previously explained, the teachers in that study became advocates of developmentally appropriate practice following their exposure to the benefits of play-based learning. It will be my responsibility to advocate for play-based learning to make improvements in education for those who cannot advocate for themselves.

The findings in this study confirm on three fronts that play is important and impactful in education. First, by surveying parents, teachers, and administrators I was able to ascertain that each of these groups of adults do consider play to be important in early childhood education. Second, by interviewing the students I learned their perspectives on the play activities provided. Students indicated that they understood what they were learning through play, and that they had fun with the play-based learning opportunities provided. Third, play was shown to have a positive impact on students' math scores in the areas of number recognition and quantity comparison. This was possible while only using play as a supplement to the curriculum.

In the research examined, play has only been shown to have positive effects on children's learning. The research is consistent over time. I explored new sources, none more than two years old, and all the research indicates the benefits play and play-based learning has on children and their learning. For example, Taylor & Boyer (2019) have discovered that through play-based learning certain social norms can be learned that may not be able to be learned through seat work such as turn taking, transitions, and

conversation routines. Paterson (2020) indicates that there is a strong case that play-based pedagogy enhances and supports children's learning and development. Paterson (2020) further explains, play-based pedagogy is beneficial in both developmental and academic learning to provide 21st century skills such as communication, cooperation, and self-regulation. The benefits that play-based learning provides are immeasurable.

## Recommendations

Conforming with the tenets of developmentally appropriate practice (DAP) is what is being suggested. A return to implementing what is developmentally appropriate for children is not a new or radical concept. WE HAVE DONE IT BEFORE. DAP is backed up with research for best practice of how children learn and develop socially, emotionally, culturally, and academically (NAEYC, 2016). By allowing teachers to facilitate play-based learning experiences based on culturally relevant pedagogy and constructivist principles students could once again learn in a way that is developmentally appropriate.

This is unattainable using a canned scripted curriculum no matter how many manipulatives are incorporated because the children have no voice. Students are expected to be passive receptacles of the knowledge put forth not active participants in the learning process. Student input is necessary for them to gain ownership of the learning and create meaningful developmentally appropriate learning opportunities. The decision to change the curriculum to a canned and scripted curriculum that in many cases does not follow developmentally appropriate practices or the research based on how students learn has been disheartening. I would recommend that even if NAEYC accreditation is not a possibility that we return to teacher-facilitated play-based

developmentally appropriate learning for all students in our child development program. I believe the possibilities could be amazing!

Data collection should still take place. However, anecdotal evidence and portfolios of student work would be much more representative of students' abilities. By collecting data in this way rather than testing to generate a number would indicate what students are able to accomplish over time not just a snapshot of their current abilities. Students' individual progress could be monitored to show their actual development with a focus on the process rather than the product. Students, especially in the early childhood years, are at many developmental levels; consequently, progress should be monitored on an individual basis rather than as a comparison of one student to another. This recommendation is also indicative of DAP. By collecting data in this way, the uniqueness of each child can be adequately ascertained.

I recommend that the action research process for this study continue. Action research is a cyclical and self-reflective intentional process that is meant to explore new possibilities and expound on the current research (Efron & Ravid, 2013). This mixed methods action research study explored attitudes and perspectives of stakeholders and what is possible when play-based learning is differentiated and used to supplement the curriculum.

## Implementation Plan

I understand that I may need to become further involved and take a more active role in advocating for curricular changes in the district. I recognize the need to take the results of this study to the director of our program, the principal, and district curriculum coordinators. To gain further support, the findings of this study need to be presented to

fellow early childhood educators, the district director of early childhood education, the district math coordinator, district officials, and potentially school board members. The results of the study have exhibited what can be accomplished through play-based learning on a very small scale, but with a substantial impact on test scores. These findings should certainly be of interest to administrators interested in improving test scores. By trusting the research and the possibilities highlighted by the study, should play-based learning in all early childhood education classrooms in our district not at least be explored? All stakeholders have a vested interest in this study and the possibilities that could become reality for all.

At the very least an examination of the alignment between the current curriculum, state standards, and assessments should be explored. The curriculum, standards, and assessments should all work in concert and ask for the same knowledge content to be addressed. The adoption of any new curriculum should be thoroughly examined for adherence to standards, assessments, and be developmentally appropriate for the students served. Something needs to change because at the present time this is not a reality.

I welcome the opportunity to work with teachers and administrators to create an avenue for bringing experiential learning through play back into use in conjunction with a developmentally appropriate curriculum. This would include continued data gathering and evaluation to ensure that teaching and learning are perpetually occurring at the highest level possible. I am also open to the possibility of providing workshops for early childhood education teachers who may be unfamiliar with play-based learning in conjunction with developmentally appropriate practice.

This study has brought to light what is possible when differentiated experiential learning through play is implemented only as a supplement to the curriculum. I understand the state requires that our program must adopt a curriculum. I am not suggesting reinventing the wheel but returning to using a play-based curriculum and developmentally appropriate practice. Before the NAEYC tuition-based program was absorbed into the Title I program we stated that we were inspired by our play-based curriculum, but we did so much more than that curriculum required. I am suggesting that we as a program once again embrace a play-based curriculum and return to implementing the developmentally appropriate practices as designated by the NAEYC. If this plan is implemented, teachers will be able to creatively facilitate play-based learning for the students, and students will be able to follow their own inquiries returning our program to using what is developmentally appropriate and best practice. I understand that adherence to DSS regulations can be difficult and that NAEYC standards incorporate over 400 criteria to be met. I have been through the accreditation process twice. It is difficult, but it ensures that children have the best learning environment possible, and I believe it is worth the effort.

## Reflection

Modify and adjust were prevailing themes during this mixed methods action research study. COVID-19 presented challenges including an initial uncertainty of how to collect play-based and interview data, especially based on play activities with students who were learning virtually. I had originally planned to only collect data on students who were accelerated and those lagging in skill development. However, when students were all learning from home, I was able to use video evidence collected by parents on the work

of all students, and as a result, I included them all in the study. As an action researcher, it was difficult for me to leave collecting video evidence for some students solely up to the parents. In this case, however, I really had no choice.

During the study, I never had more than six in-person students. The challenge with these students was that they had to remain six feet apart for safety purposes which made it very difficult for them to interact for some of the activities. As a result, in these cases, during the play activities, I had to take on the role of the more competent peer to ensure the safety of the students. No students in my charge during the study contracted the virus.

I had also planned to incorporate teacher-made assessments into the data which were created to challenge students who were able to perform higher than the *myIGDIs* assessments require. However, I did not account for the fact that it would be a challenge to get students to come to the school for a test preceding (January) and following (February) the study instead of coming for only one test, which was the case. The initial pre-test in October was going to be used to determine who the students for the study would be and who would be a candidate for the teacher-made assessments. Instead, I used the pre-test in October as the baseline for all students and the post-test in February showed the students' progress over time. Such a time lapse could have indicated that students made their gains only through a maturation effect and the Eureka Math curriculum. However, Eureka Math only challenges students to learn numbers 0-10 and to compare quantities up to five. The play activities I introduced challenged students to identify numbers 0-20 and quantities up to six. The requirements of this intervention are what is required for the *myIGDIs* assessments.

I expected students to perform well based on my previous experience using play-based instruction for students. Students may have been able to perform even better if the instruction provided could have been completely play-based and not just a supplement to the curriculum. I will discuss this further in the limitations section. I also expected students to enjoy the play-based activities provided because of the hands-on constructivist nature of the selected activities. In my experience, students like to construct their own learning. It gives them ownership of the learning process and a sense of accomplishment when they can see themselves progressing.

I did not expect students to enjoy the activities to the extent that they did as reflected in the student interview questions. I also did not expect for students to perform as well as they did on the assessments. The play-based activities had a remarkable impact on the students' test scores and the student interviews reflected attitudes that were overwhelmingly positive.

I certainly did not expect to have to contend with a world-wide pandemic during my study, and as a result I did not know if my study would even be viable. However, the parent participation during the whole process was amazing. I fully expected for video submissions as evidence of attendance to significantly decrease as a result of a change in district policy. The district change required students to show up for only 20 minutes each morning to be counted present for the day. My classroom parents remained steadfast and continued to submit videos for my study even though they were not required to do this. I was humbled and greatly appreciative of their efforts to help me complete the study.

I believe that using the teacher-made assessment data could have strengthened the study. The teacher-made assessments required students to name higher numbers and

subitize larger quantities than the *myIGDIs* assessment required, and as a result, could have shown which students could perform to a higher standard than is required. Students could also be properly challenged based on ability to show what they know.

I learned that play-based learning as reflected in this study is the way that young children learn best. The students far exceeded my expectations and were excited about the learning through play opportunities that were provided. The students were learning while having fun. In addition, although pedagogical practices do not always reflect the importance of learning through play, the survey data reflected that parents, administrators, and educators all hold play in very high regard. To me, this means that changes may need to occur from the bottom up instead of from the top down regarding curricular and educational changes in early childhood education.

Personally, I value this research because I am an unashamed proponent of play in early childhood education. The results of this study demonstrate the impact play can have in an early childhood classroom, and this study was only for six weeks! I have been teaching prekindergarten for 16 years. When I began, there were no early learning state standards. Our district prekindergarten teachers wrote their own standards. There was no adopted curriculum and teachers were trusted to teach students based on their professional learning and the students' inquiries not a scripted curriculum that left no creativity or imagination up to the teachers or students. Students learned and constructed their learning through play. The age of accountability happened, and now there is fear that students will not be able to perform as well on standardized tests if there is any instructional time that is not geared toward those tests. The earlier is better approach has gained traction and is putting undue stress on students and teachers. In my experience,

and as reflected in this study, students learn better in an environment that is play-based and allows for creative freedom.

Professionally, based on this and similar research, I would like to see a return in early childhood education to learning based on teacher knowledge and student inquiries with authentic assessments that measure what a child has learned and the progress that has been made. There is too much emphasis on generating a number for data analysis. The students in my class are as much as 11 months apart in age and as a result are not developmentally or academically in the same place nor should they be. We need to focus prekindergarten on developing the whole child and child development with all skills learned being given the same importance they deserve. Literacy and math skills should not be the primary focus just because test data is collected on these skills. Child development should mean just that—the development of children.

## Limitations and Suggestions

As a result of COVID-19, the study had to be substantially modified and would be difficult to recreate during a "normal" school year. However, it was rewarding to be able to include all the students in the study, which would not have been possible in a typical school year. In addition, I would have liked to have been able to have students play together as they normally do and not have to always remain six feet apart. This limitation restricted the amount of peer-to-peer interaction for the in-person students. Students learning at home whose video evidence I observed usually worked one-on-one with an adult for the play activities.

I would have liked to have been able to teach solely using differentiated experiential play-based instruction. However, the play-based learning activities were

only able to be implemented as a supplement to the curriculum. Although the current Eureka math curriculum does use many manipulatives in the lessons, it also uses worksheets which are developmentally inappropriate for prekindergarten students (Bredecamp & Copple, 2002). Eureka math does not sufficiently address the needs of students far below or far above the level of the material presented. In addition, the Eureka math curriculum does not align well with the myIGDIs assessment. The myIGDIs assessment requires much more than Eureka math or the state standards and as a result should be revisited. It does not make sense to have an assessment that does not align with curriculum or standards.

I would suggest implementing differentiated experiential learning through play in all aspects of a learner-centered curriculum. This has worked in the past, and I believe the results would be beneficial for all teachers and learners in early childhood education. The results of this study indicate that differentiated play-based learning does have an impact on student's learning and substantial research has indicated that children have the ability and benefit by creating their own learning through play (Dewey, 1938; Piaget, 1952; Montessori, 1909/1964).

## Recommendations for Future Research

As previously stated, I would recommend that research continue and build upon the research and findings of this study. The study has demonstrated through the data collected that play is valued as an educational tool by parents, teachers, administrators, and students. In addition, play-based activities were shown to have an impact on students' academic achievement in math. With this supporting evidence, I would suggest that future research for a study using only play-based learning be constructed to

determine the impact that could be achieved. If teachers as facilitators are permitted to provide constructivist play-based learning opportunities for their students without the confines of a scripted curriculum, it would be interesting to learn the effects. Moreover, if the effects are found to be positive, the impact on students' learning could be substantial. The current research only focused on two mathematical areas: number identification and quantity comparison. Future research could also expand the study to more or all areas of the curriculum.

The teacher-made assessments could be implemented to determine the efficacy of the MyIGDIs assessments in determining the needs and abilities of all students. The study as originally envisioned before the COVID-19 pandemic could be realized. In addition, the study could be applied to multiple classrooms to see if the current data holds or if different outcomes may occur in other settings. Play-based learning could also be explored through many possible intersecting lenses (gender, ethnicity, SES, age, etc.).

## Summary

This mixed methods action research study examined prekindergarten students in a Title I program. The problem of practice addressed was that students were not being given enough differentiated experiential learning through play opportunities, and as a result many were struggling or not able to reach their full potential. The study investigated the impact of differentiated experiential learning though play on the students' attitudes and learning of mathematical skills as measured by a standardized test. The following research questions were addressed: 1) What are the attitudes/perspectives of the parents, educators, and administrators on the value of play in early childhood education? 2) How does providing experiential learning through play impact students'

attitudes toward math? 3) How does providing experiential learning through play impact students' academic achievement in math? Parents, educators, and administrators were surveyed to learn their attitudes and perspectives, and students were interviewed to learn their attitudes about the learning opportunities provided. Data collected indicated that overall, parents, educators, and administrators had a positive view of play. Data collected also indicated that students overall had a positive attitude about the play-based activities provided during the study. The assessments of students' abilities to recognize numbers and compare quantities yielded an overall increase in achievement. The results of the statistical analyses performed indicated that this increase in students' achievement in math as a result of the intervention is statistically significant.

The findings have also been addressed in relation to the literature review that was provided and revisited to acknowledge new research related to the current study. The importance of play in early childhood education, developmentally appropriate practice, and the theoretical basis for play has been provided. The methodology, research design, data collection strategies, and data analysis were also thoroughly explained. Actionable practice recommendations have been provided. In addition, an action plan has been proposed to include the developmentally appropriate differentiated experiential learning through play activities used in this study and recommendations for developmentally appropriate practice. A reflection by the researcher has been provided to give the reader further insight into the expectations, limitations, and implementation of the study. The limitations of the study and recommendations for further research are provided.

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## Appendix A: myIGDIs Assessment Materials


*Figure A.1 Number Assessment*


*Figure A.2 Number Assessment Item*

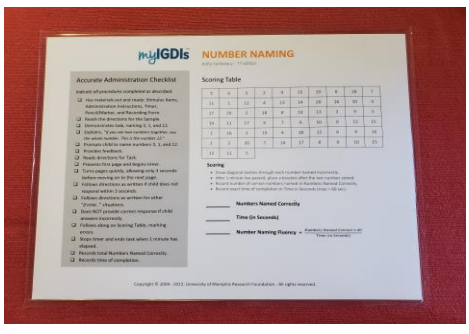


*Figure A.3 Scoring Sheet*


*Figure A.4 Qty. Comp. Assessment*

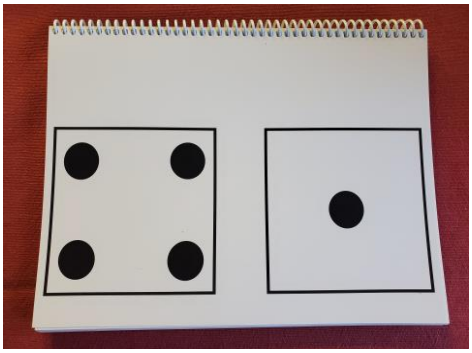

*Figure A.5 Qty. Comp. Assessment Item*

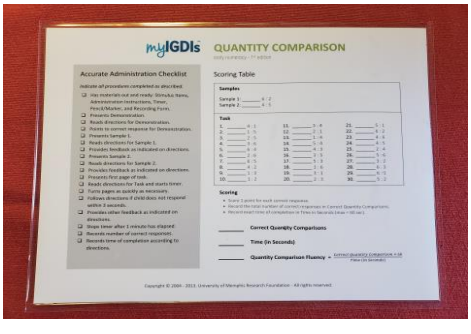


*Figure A.6 Scoring Sheet*

## Appendix B: Survey Participation/Consent Letter

Dear Stakeholder (Parent, Early Childhood Educator, Administrator, or Student),

My name is Charles Reed. I am a doctoral candidate representing the College of Education at the University of South Carolina. I am conducting a research study as part of the requirements of my degree in Curriculum and Instruction, and I would like to invite you to participate in my survey study.

The survey is eight questions with a section for you to provide additional comments at the end. The survey should take **5-10 minutes to complete.** The survey will open on (**Month Day, Year)** and close on **(Month Day, Year).**

**Only one survey attempt will be allowed, so please ensure you have ample time to complete the survey at one time.**

I am studying the attitudes/perspectives of the stakeholders (parents, early childhood teachers, administrators, and students) on the value of play in early childhood education. If you decide to participate, you will be asked to complete an electronic survey about your attitudes, perspectives, and experiences concerning play.

Participation is anonymous, which means that no one (not even me) will be able to identify your responses. So, please do not include your name or other identifying information on any of the study items. Participation is voluntary and there will be no negative consequences if you choose not to participate.

I will be happy to answer any questions you have about the study. You may contact me at reed22@email.sc.edu.

Thank you for your consideration. If you would like to participate, please open the link to complete the survey.

With kind regards,

Charles Reed

University of South Carolina
Curriculum and Instruction
College of Education

reed22@email.sc.edu

**If you are ready to complete the survey, please click the link below.**

**Password: (Will be provided)**
**Survey Link: (Will be provided)**

**Survey Window:** Month, Day, Year (12:01 a.m.) – Month, Day, Year (11:59 p.m.)

## Appendix C: Survey Questions

### Adult Perceptions of Play

1. Please select one of the following:
    a. I am a parent/guardian.
    b. I am an early childhood educator.
    c. I am an administrator.
2. How important is play for your child/students?
    a. Extremely important
    b. Reasonably important
    c. Not very important
3. Currently, how much does your child/do your students enjoy their play activities at school? (Feel free to ask them!)
4. What type of play activities do you remember being involved in when you were a child both at home and at school?
5. Do you feel you benefitted from your play experiences as a child? If yes, please explain what you learned or how you believe your play experiences helped you develop as a child.
6. Do you believe your child/students has/have the same play opportunities at school/home as you did? If no, please explain why not.
7. If school could improve the play opportunities they offer, what types of things would you like to see and why?

8. Students in our prekindergarten classes…

    a. should have more time to learn through play.

    b. should have less time to learn through play.

    c. have just the right amount of time to learn through play.

**Please feel free to add any additional comments or concerns about play or any other educational inequities that you believe exist and should be addressed.**

## Appendix D: Interview Questions

**Interview questions for prekindergarten students to answer the following research question:**

How does providing experiential learning through play impact students' attitudes toward math?

1. Did you enjoy the math learning through play activity (subitizing; number recognition) we just completed?
2. What did you like/not like about the activity?
3. Would you want to have this play activity again?
4. Why would you want/not want to have this play activity again?
5. What did you learn?
6. Why do you need to know this?

## Appendix E: Learning Materials

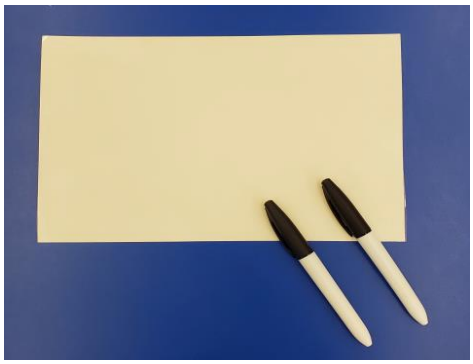

*Figure E.1 Dry Erase Boards & Markers*

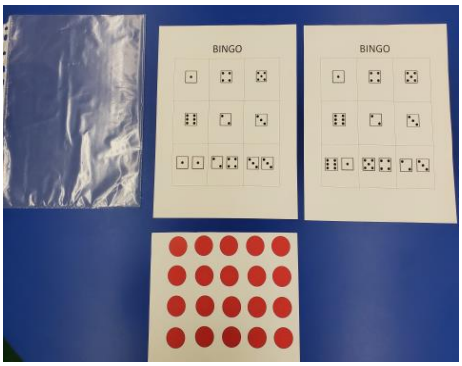


*Figure E.4 Dice Bingo*

*Figure E.2 Number Cards & Play Dough*

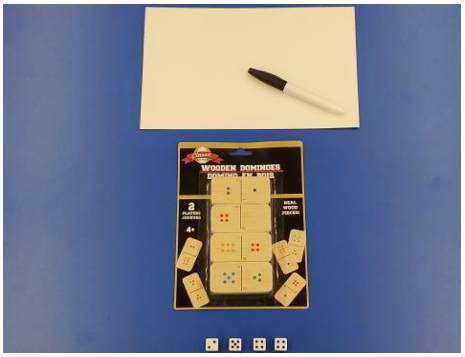


*Figure E.5 Dice & Dominoes*

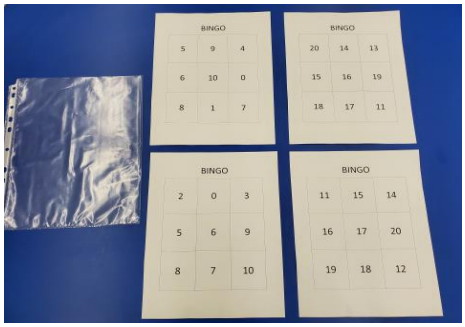


*Figure E.3 Number Bingo*

*Figure E.6 Stickers & Cards*

## Appendix F: Number Identification Data Analysis

## Minitab Express Software Program

*Table F.1 Number Identification Pre-Test and Post-Test Data*

### Paired t: Pre-test, Post-test

Descriptive Statistics

| Sample | N | Mean | StDev | SE Mean |
|---|---|---|---|---|
| Pre-test | 18 | 9.333 | 8.478 | 1.998 |
| Post-test | 18 | 18.611 | 13.272 | 3.128 |

Estimation for Paired Difference

| Mean | StDev | SE Mean | 95% CI for $\mu_d$ |
|---|---|---|---|
| -9.278 | 7.969 | 1.878 | (-13.241, -5.315) |

$\mu_d$: mean of (Pre-test - Post-test)

Test

Null hypothesis $H_0: \mu_d = 0$

Alternative hypothesis $H_1: \mu_d \neq 0$

| T-Value | P-Value |
|---|---|
| -4.94 | 0.0001 |

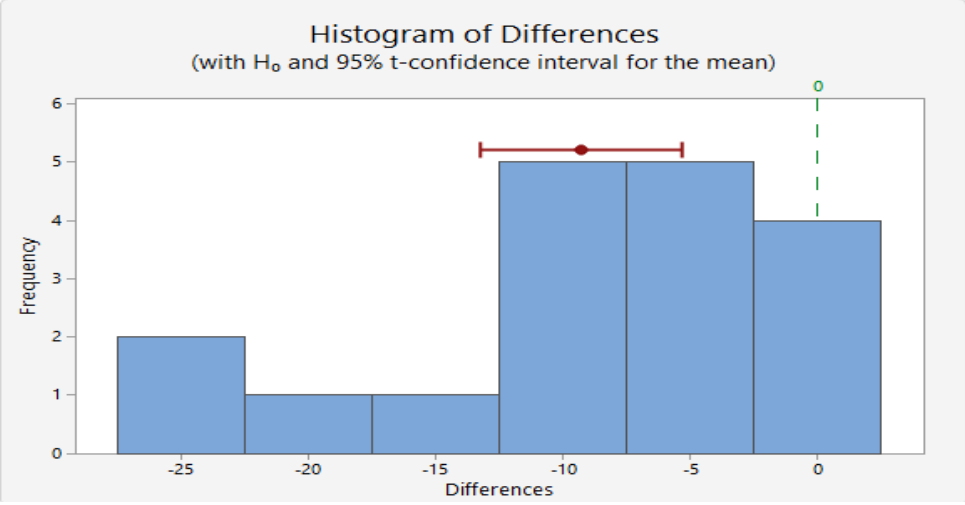


*Figure F.1 Histogram of Differences*

## Appendix G: Quantity Comparison Data Analysis

## Minitab Express Software Program

*Table G.1 Quantity Comparison Pre-Test and Post-Test Data*

### Paired t: Pre-test, Post-test

**Descriptive Statistics**

| Sample | N | Mean | StDev | SE Mean |
|---|---|---|---|---|
| Pre-test | 18 | 19.111 | 6.416 | 1.512 |
| Post-test | 18 | 26.444 | 3.666 | 0.864 |

**Estimation for Paired Difference**

| Mean | StDev | SE Mean | 95% CI for $\mu_d$ |
|---|---|---|---|
| -7.333 | 4.406 | 1.038 | (-9.524, -5.142) |

*$\mu_d$: mean of (Pre-test - Post-test)*

**Test**

Null hypothesis $H_0$: $\mu_d = 0$

Alternative hypothesis $H_1$: $\mu_d \neq 0$

| T-Value | P-Value |
|---|---|
| -7.06 | <0.0001 |

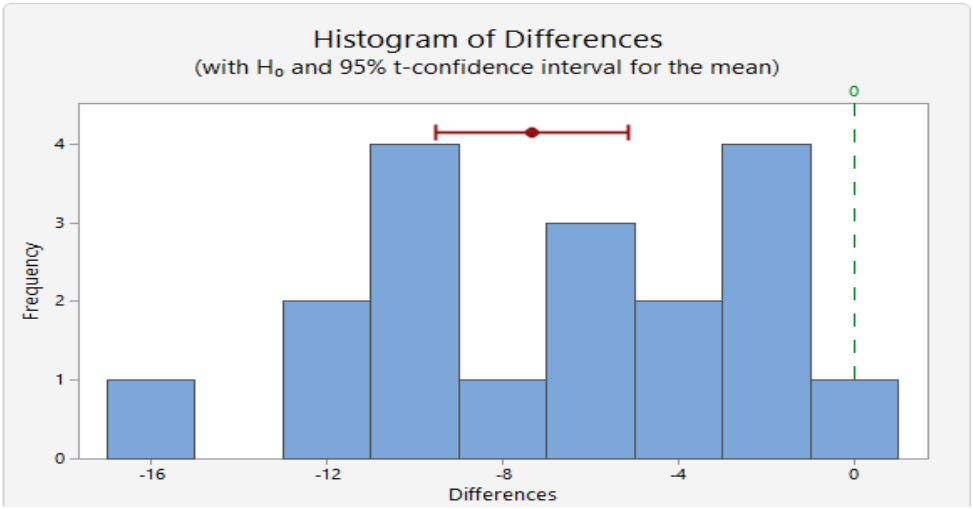


*Figure G.1 Histogram of Differences*