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# Promoting Writing Development in Preschoolers

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# PROMOTING WRITING DEVELOPMENT IN PRESCHOOLERS

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**DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY**

This project, written by Claudia Maria Ortiz under direction of Julie Duckart, Faculty Mentor, and approved by members of the project committee, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF OCCUPATIONAL THERAPY

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Certification

We hereby certify that this Capstone project, submitted by Claudia Maria Ortiz, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the project requirement for the Doctor of Occupational Therapy degree.

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**Executive Summary**

**Background**: Providing extended opportunities for early writing and early literacy for preschool children into the lessons will enhance their writing skills.

**Purpose**: The purpose of this capstone was to examine the effectiveness of providing a structured early writing plan to the preschool children to promote writing development and early literacy skills.

**Theoretical Framework**. The Model of Human Occupation (MOHO) guided this study.

**Methods**. This quasi-experimental research measured the emerging writing and early literacy levels of a selected group of 12 preschool students. The *Learning Without Tears* (LWT) Pre-k Assessments, the *Readiness & Writing,* and the *Language & Literacy* were used as assessments to collect data. The data acquired was used to compare the pre and post-interventions results.

**Results**. Data was only obtained from the first 2 weeks of the intervention out of the 6 weeks originally planned, because the study was terminated prematurely due to the COVID-19 epidemic. The Wilcoxon Signed Rank Test convey that the pre-and post test scores were not statistically significant, except for one of the Checklist items #17, that was statistically significant. The comparison of the work samples pre and post presented that some students had improved in their drawing and writing based on the assessment criteria.

**Conclusions**: LWT work samples and investigator observations reveal clinical differences and growth in the participants' writing, but there didn't turn out to be much of a statistical difference. This is due to the effect COVID-19 had on the duration of the study.

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## CERTIFICATION OF AUTHORSHIP

Submitted to (Faculty Mentor's Name): Dr. Julie Duckart

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Title of Submission: Promoting Writing Development In Preschoolers

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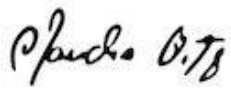
Student's Signature: 

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## Section 1: Nature of Project and Problem Identification

### Introduction

Writing is a complex task. The developmental stages of writing include pre-literacy, emergent, transitional, and fluency. Once children learn to write, writing becomes an effective tool used to communicate with other people. Children's writing supports them to develop their imagination and produce a series of letters that mean a language. Writing as an experience for children is a manifestation of their interest in communicating with others.

Preschool children are in need of receiving more writing opportunities from teachers and occupational therapists in the classroom. An early focus on the practice of promoting writing development prevents children from becoming poor writers. Children with poor handwriting skills tend to have lower achievement in the later years of school, particularly in mathematics, reading, and writing. Over 25 years, research in the early writing field has been increasing, and studies have found out that rich classroom environments with ample writing opportunities will help children to enhance their early writing skills.

The development of writing progresses in stages (Gerde, Bingham, & Wasik, 2012). Early writing is connected with language development; therefore, it is necessary to support the development of children's writing (Al-Maadadi & Ihmeideh, 2016). Emerging writing is part of the developmental stages of writing including pre-literacy, emergent, transitional, and fluent. The process of learning to scribble on paper to writing more precise forms is the common way that most children learn to print. They start representing writing from drawings, and then they progress to scribbles, then to marks, symbolic mock letters, letters, numbers, and lastly, words.

They begin with imprecise scribbles, drawing outside of the lines, and painting using paint brushes or fingers.

**Problem Statement**

This capstone addressed the children's need to foster handwriting and early literacy skills by promoting early writing development in the preschool children, with and without developmental delay, through the incorporation of diverse early writing and literacy strategies into the daily practice and lesson plans. Effective approaches to teach handwriting are important to better promote the writing development of children. The intent of this program was that by providing more early writing opportunities to preschool children and by combining these writing lessons with literacy development, these children would be more successful in writing and literacy when they enter kindergarten. This program focused on enhancing the early writing skills of preschool children using handwriting activities, promoting the development of literacy in stages which include the components of print knowledge, name writing, alphabetic knowledge, and uppercase and lowercase letters.

The average daily duration of lessons that develop writing skills in preschool classroom is 2.07 minutes, for alphabet knowledge it is 2.77 minutes, and for print concepts it is 0.38 minutes, which is not adequate time for children to acquire these skills (Pelatti, Piasta, Justice, & O'Connell, 2014). This demonstrates that there is a need to provide extended time and more opportunities to promote children's writing development. Preschool aged-children that attend the developmental preschool classroom are in need of receiving consistent strategies and opportunities to support and enhance their handwriting skills. The developmental preschool

classroom has children with developmental delays and children without delays; all of these children are in need of developing their writing skills.

The development of fine motor skills is essential in the early years of education as they are a good predictor for the later years of a child's academic career (Memisevic & Hadzic, 2013). There is limited evidence on the effectiveness of handwriting programs implemented at the preschool level, and there is a need for the implementation of this program that will benefit all children with developmental delay and without developmental delay. There is a need to demonstrate that the use of effective strategies to promote writing and the use of diverse literacy activities in the preschool curriculum will positively impact the handwriting skills of all the children, with disabilities and without disabilities.

**Purpose of the Project**

The purpose of this quasi-experimental research was to examine the effectiveness of implementing a structured early writing plan in the preschool classroom to promote writing development, print concepts and alphabet knowledge of preschool (ages 3-5) children with and without developmental delay and who are enrolled in a half-day developmental preschool program in a suburban area.

The independent variable was the extended learning opportunities for early writing for preschool children, which was provided during the daily lesson in class as part of the educational program. This involved the collaboration of the special education teacher and paraprofessionals. The dependent variable was the development of the children’s writing skills after the program begun. The dependent variable of the children’s writing development was measured by several Learning Without Tears Pre-K assessments, which are the Readiness & Writing 1:1 Pre-K

assessment; the Readiness & Writing Observation Checklist, and the Language & Literacy 1:1 assessment.

**Hypothesis**

Preschool-aged children with or without developmental delay who undergo an effective, extended, consistent and structured early writing development program for 6 weeks will improve their writing skills.

**Research Question**

Will the implementation of extended learning opportunities in handwriting, letter knowledge and print concepts into the preschool classroom lessons enhance the emerging writing skills of preschool children with and without disabilities?

**Project Objectives**

The research objective was to examine if providing extended learning opportunities in handwriting, letter knowledge, and print concepts into the preschool classroom lessons would enhance the emerging writing skills of preschool children with and without disabilities.

**Theoretical Framework**

Writing and handwriting are some of the major concerns in the education setting for the school based occupational therapist. Early treatment by the occupational therapist is fundamental to addressing the fine motor delays of children and to promote their functional performance in school and in home activities. During the implementation of this program, the Model of Human Occupation (MOHO) framework addressed the application of the program and the outcomes of the children.

The main components of the MOHO are the person's occupation that are based on volition, habituation, and performance and environment (Kielhofner, 2008). For my study, the use of play served as the main occupation for the preschool children. The use of play motivated them to participate and to perform the activities. Volition is made up of values, personal causation, and interests. The habituation of the model is based on the daily practice of the fine motor skills that would become a routine for the children during their activities.

Writing development was also studied by Lawhon and Cobb (2002), who described the importance of establishing literacy routines to enhance young children's learning. The use of appropriate activities, routines, environment, tools, and materials are important for the development of writing. Children then need to be exposed to environments that promote emergent literacy to enhance children's abilities to listen, to observe, to speak, and to develop their reading and writing skills. Gerde, Foster and Skibbe (2014) mentioned that occupational therapists must consider the environment as a meaningful strategy to promote writing for the children. Playing also facilitates children to manipulate literacy objects like books and also gives children, for example, an opportunity to create a shopping list, which will help children to develop invented writing. The use of play is a powerful strategy for the occupational therapist that works with preschool children and is one of the primary roles of the occupational therapy in school-based practice (Couch, Deitz, & Kanny, 1998).

**Significance of the Study**

The objective of this study was to demonstrate that the daily practice of handwriting skills, literacy knowledge of the alphabet, and print knowledge would enhance the writing skills of the children with and without developmental delay.

For the investigator, this project provided the opportunity to implement and use evidence based practice (EBP) in the daily support of the children to develop the children's emerging writing skills. On a larger scale, this project can be of importance, because it unites the fields of teaching and occupational therapy. Teachers can use their experience and the support obtained from the OT to develop lessons that focus on enhancing the children's writing skills.

The goals of this research strived to fulfill the overarching goals of Healthy People 2020. The Healthy People 2020's developmental objectives in early childhood children are to increase the number of children who are developmentally on track and ready for school (2018). According to Healthy People 2020, the development of the children in all areas including the physical development will influence the school readiness and future school years (2018).

In addition, this program aligned with the goals of the Federal Government's law and the Individuals with Disabilities Education Improvement Act of 2004 (IDEA 2004) part B by supporting children with disabilities and providing education for all preschool children with disabilities. Part B is regulated through the Arizona Department of Education Special Programs (Statute and Regulations | Individuals with Disabilities Education Act, n.d.).

My program also promoted the objective of the Health Indicators of Healthy People of Early Childhood Health and AOTA's Vision 2025 in that it provided an effective practice that is client-centered and collaborated with clients to obtain better outcomes.

**Summary**

The development of writing skills in these young children would benefit them in their success through school and overall academic performance. This study sought to demonstrate that providing a thorough, extended, consistent and structured early writing plan to preschool

children, combined with the emergent literacy skills, would improve their writing skills. The idea was to implement the program in a developmental preschool classroom and to evaluate their levels before and after the intervention. The implementation required the use of multiple handwriting strategies applied by teachers in this project who used their own experience and the new knowledge obtained from the literature research to develop a strong plan that focused on enhancing the children's emerging writing skills.

In general, children that have more experiences and have been receiving stimulation will experience positive development and tend to be more successful in their school and life (Healthy People 2020, 2018). During the initial years of a child's life, milestones are essential for the child's development. If the child does not receive the adequate support, their milestones can be significantly delayed. Children in their early childhood stage are in an integral stage of development. They need to undergo many diverse learning experiences that will contribute to the development of their physical, emotional, adaptive, social, cognitive, and communicative areas, or else they will begin to experience delay and their milestones will be affected.

## Section 2: Literature Review

### Introduction

The literature review is focused on studies about early writing development of preschool children and the components that support the emergent writing skills for preschool children. Writing is a skill that begins to develop in the first years of life, and it is a skill that is essential for the occupation of writing for school-age children. I explored research that focuses on the developmental stages of writing and the relation of this writing development with early literacy skills. To support this capstone, the information was retrieved from academic journals and internet-based searches. The main keywords were handwriting, emerging writing, early writing skills, preschool writing development, pre writing skills, emerging literacy skills, prewriting instruction, and young children writing. Diverse academic databases were searched to support content knowledge related to the topic. Some websites such as the American Occupational Therapy Association (AOTA) provide great information regarding occupational therapy's role in helping children to develop their writing skills; other databases used were Academic Search Premier, Google Scholar, and World Cat.

### Writing Development

Gende et al. (2014) supported that children develop their writing skills through developmental steps. Children generally begin writing with scribbles of large or circular strokes or abstract marks. Their writing resembles imprecise scribbles, drawing outside of the lines, and painting using paint brushes or fingers. Their skills then transition from scribbling on paper to writing more precise forms. Their objectives for the end of the school year may be to successfully write the first letter of their names or write their entire names, to form some letters even if they are incorrect, and to be able to trace their name or copy words from a sample (Renee, 2015).

Cabell, Tortorelli, and Gerde (2013) also support that the early writing development of

children begins with drawing and scribbling. They start from drawing big lines and then they progress to drawing small lines, shapes, then to letters, numbers, and words. This level of development is an important step because children later need to distinguish between writing and drawing. Initially, both are developed at the same time, and both skills are part of the writing development. In their study, the authors witnessed how children developed their writing by levels and how activities helped the children to enhance their writing skills. Brenneman, Massey, Machado, and Gelman (1996) describe the writing and drawing mechanics of 48 children in school. The analysis studied the differences in the children's movements between drawing and writing. Children struggled more in writing compared to drawing, because they needed to have knowledge of the words and the specific letters. On the other hand, when drawing, children were able to outline a picture or color it more easily.

**Understanding Early Writing Skills**

Puranik and Lonigan (2014) had studied and evaluated a theoretical model related to three components of emerging writing, which are conceptual knowledge, procedural knowledge, and generative knowledge. The goal was to articulate and evaluate a framework for the assessment of the writing of young children. In total, 372 children from 36 to 71 months participated in the study. Children were tested individually and they completed a writing assessment. Their parents completed a questionnaire and the teachers were consulted to ensure the children were without any delay. The result of the study provides support to the emergent writing model that contains the three domains.

Puranik, Petscher, and Lonigan (2014) investigated the most important factors in the development of letter and writing skills in preschool children. A total of 415 children, ranging from three-five years of age were part of a large study where the children were tested in quiet environments and in three sessions. Children were asked to write uppercase and lowercase letters of the alphabet randomly. They did not receive previous feedback of the test. For this

study, the use of the Phonological Awareness Subtest and letter sounds were tested individually. For the analysis of the descriptive data, the letter formations were coded. The results portrayed that letter writing at different ages is more assessed during school readiness activities. Student factors contribute more to letter writing skills than letter factors.

The same authors, Puranik, Petscher, and Lonigan (2013) examined how children learn to write the letters of the alphabet and the gender differences in the development of writing skills. A total of 471 preschool children were tested as they performed a writing task for this study. To evaluate letter-writing skills, the children wrote 26 letters of the alphabet randomly. The dimensionality of letter-writing was evaluated using diverse methods. The results identified significant differences in the performances of age groups on the letter-writing task. The group of four year old children scored higher than the three-year-old group.

The study by Molfese, Beswick, Molnar, and Jacobi-Vessels (2006) explored the components of the letter knowledge procedural that involves letter-writing skills and letter-naming. The study took place during the Fall and examined 79 children enrolled in preschool programs with low income. The children were evaluated using a standardized assessment for writing, letter naming, word reading, receptive vocabulary, and general cognitive abilities. The results obtained from a descriptive analysis reported that there is a relationship between letter naming skills and writing skills. They found some evidence related to the hypothesis that letter-name knowledge and phonemic awareness is essential for writing skill development. Brenneman, Massey, Machado, and Gelman (1996) observed that one of the main factors for why children experienced difficulties when writing was due to the lack of knowledge of specific words and letters. Cetin, Gulhan, and Katranci (2018) demonstrated that preschool education has a positive impact on children’s literacy skills. They identified in their study, the

literacy skills of preschool children according to their age, gender, and it explored the effect of their education on the development of their early literacy skills. Children were evaluated based on their writing preparation, name writing, and phonological awareness.

**Role of Teachers to Support Early Writing Skills**

Some articles explain how preschool teachers support children's handwriting development in the classroom. The teacher is a facilitator that guides the students during the process of writing (Byington & Kim, 2017). Teachers model instruction with examples of emerging writing such as letter knowledge, letters as forms, name writing, and writing expression. Al-Maadadi and Ihmeideh (2016) described the teachers' beliefs regarding children's emergent writing. A total of 123 kindergarten teachers completed a survey questionnaire developed by the researchers. The study used descriptive statistics; the findings of the research convey that teachers have a positive belief about the influence of early writing development in the children's abilities to learn to write.

Dennis and Votteler (2012) explained in their article that early literacy skills are essential during the preschool years. They focused on two essential strategies that preschool teachers must use—a writing workshop and dictation based on reading. The purpose is for children to become authors and to create a message when they write. They communicate a message when they scribble or draw a picture. The idea is that children talk about their writing and present it to others. The teacher is a facilitator and must provide modifications to the children that have difficulties in speech. The teacher also can use the question to encourage communication and participation. Children benefit from the teacher's support to develop their writing skills for that is necessary to provide more extended time for handwriting. Some studies explained that preschool

children are receiving a few minutes of writing instruction and this is not enough time for them (Pelatti, Piasta, Justice, & O'Connell, 2014). Creating a literacy-rich environment is essential to promote children's participation. Bay (2015) investigated the participation of preschool children at the writing center and found that it is important to add materials to support the children's writing skills to motivate them to write and participate.

Another study explored the needs of the kindergarten teacher and the needs of receiving support to be successful when teaching handwriting. Nine teachers participated in the study from four elementary schools. They were interviewed based on the challenges that they have in regards to supporting children to promote their handwriting. According to Nye & Sood (2018), there is a gap in the teacher's ability to use strategies that supports children to develop the skills to enhance their writing skills. In their study Nye and Sood (2018), discusses the needs of the teacher to improve their knowledge related to handwriting instruction. This study supports that teachers felt that it is necessary to implement more activities in the curriculum to promote the development of the children's handwriting skills.

Nye and Sood (2018) mentioned that research in this field is emerging, but there is currently not enough evidence research on how writing is taught to preschool or PreK children. The major responsibility of providing writing instructions and activities is given to the teacher. The study reports that there is inconsistency in how a teacher teaches writing to children. Some teachers do not use enough time during the day on developing this skill; other teachers use handwriting prompts during reading, and the pace is not unified with the curriculum. Overall, the results showed that the lack of a curriculum, formalized training and knowledge related to

handwriting and writing development in preschool children is one of the gaps that the teacher has.

**Role of the Occupational Therapist**

While teachers in the classroom have the primary responsibility to support the children in the development of their functional writing skills, the OT provides support to the teacher and works cooperatively with her or him to identify the best strategies to incorporate in the lesson plan. The OT will consult the teacher and provide knowledge and support related to adaptive strategies of intervention; these include reviewing work samples, modifying the environment, and recommending functional activities to develop the children's fine motor skills, etc. (Nye & Sood, 2018).

Some studies provide evidence of the effectiveness of an early intervention to support the development of handwriting skills in children with fine motor delays. For example, in the Case-Smith (2000) study, the frequency of occupational therapy services and the type of fine motor activities during occupational therapy intervention showed positive outcomes for preschool-aged children with developmental delays. These children received individual and group occupational therapy (OT) treatment for about 8 months, and during the intervention, the OT used play activities and peer interactions as strategies of intervention. The finding of this study presented a positive correlation between visual motor and fine motor with performance components, and that that the use of play activities during the OT intervention enhanced visual motor skills and fine motor performance (Case-Smith, 2000). This study matters for the related topic, because in both the Case-Smith study and in mine, the frequency and the type of intervention from the OT was fundamental in promoting the development of the handwriting

skills in preschool-aged children. Also, this Case-Smith study is related to children of preschool age with fine motor delay. The Case-smith (2000) study concludes that there exists a strong correlation between the performance components and fine motor skills after intensive treatment of occupational therapy intervention for 8 months.

In another study by Alaniz, Galit, Necesito, & Rosario (2015) evaluated the relationship between grip, pinch strength, handwriting, and independence with functional activities in children with autism. This study demonstrated that the grip and pinch strength correlate with the functional activities of the children with autism and typical children. Also, grip strength correlates with pencil control, but pinch strength did not correlate with pencil control because of the sensitivity of the instruments used to evaluate these skills (Alaniz et al., 2015). This study is related to my topic because an early intervention that promotes the grip and pinches strength served as a good strategy to stimulate the prewriting skills of the preschool children that have poor fine motor skills. The correlation of the grip and pinch with functional activities is important, because a lot of functional activities require a strong pinch and grip. My project incorporated practical activities that focused on strengthening these two skills in order to promote the development of the children's fine motor skills.

Another study, Woodward and Swinth (2002), described the multisensory modalities and activities the school-based occupational therapists use to improve the handwriting skills of the children. They found that the majority of occupational therapists use 4 types of modalities to promote handwriting skills. They use writing tools and surfaces, commercial programs such as "Handwriting Without Tears," muscle strength activities, and also a variety of diverse activities such as forming letters with pipe cleaners, playing with playdough, writing with pen, using

chalkboards with sponges or paint brushes, tracing tactile letters with the fingers, and computer activities (Woodward & Swinth, 2002). This study is related to my project, because it describes the modality of the intervention of the occupational therapist in the school setting and population.

## Handwriting Development Programs

To support children's handwriting in the classroom, there are various classroom based handwriting interventions. Some of these curriculum programs are Learning Without Tears, Write Start, Size Matters, and the Zaner Bloser handwriting program. Engel, Lillie, Zurawski, and Travers (2018) examined the efficacy of the curriculum based intervention of the different handwriting programs, and their results suggested that these programs have some improvement in handwriting legibility, but that it is necessary to conduct more research in level I to validate the programs' efficacy.

For this capstone, I applied some of the activities and materials from the Learning Without Tears program. This program is supported by the school district, funding the materials and activities necessary.

## Learning Without Tears Program

Learning Without Tears (LWT) is a multisensory structured program that serves to teach handwriting using occupational therapy pedagogy and it is used in both general and special education classrooms. The LWT program focuses on improving legibility and uses techniques such as tracing and modeling with the goal of writing all the letters correctly. This program has been implemented at the individual level and for entire classrooms in schools. The programs include the necessary materials to teach handwriting readiness, print and cursive letters; it is also

aligned with the curriculum standards (Griffith, McLaughlin, Neyman, Donica, & Robison, 2013).

**Write Start**

Write Start is an integrated handwriting and writing program that uses co-teaching where the occupational therapist and teacher collaborate in the development and implementation of the handwriting-writing program. The occupational therapist models strategies to teachers with the goal of adapting and modifying the instruction for children with disabilities. In this program, occupational therapists and teachers provide instruction and support in small groups or individually. Write Start offers peer and self modeling, and the teacher and occupational therapist are providing frequent feedback (Engel, et al., 2018). This is a 12 week program that was developed for first grade students. Case-Smith, Holland, and Bishop (2011) developed a pilot program for first grade students to promote handwriting legibility and writing fluency. They found that the students gain in handwriting eligibility and writing fluency.

**Size Matters Handwriting Program**

The Size Matters Handwriting Program (SMHP) is a curriculum based handwriting program that is focused on letter sizes. This program offers easy adaptability to the curriculum because of the child centered systematic approaches, explicit instructions, and motor learning opportunities. The SMHP is effective in improving children's handwriting legibility; this was demonstrated in a research study that examined the changes of handwriting legibility among children from kindergarten to second grade (Pfeiffer, Rai, Murray, & Brusilovskiy, 2015).

**Zaner Bloser Handwriting**

The Zaner Bloser is a handwriting curriculum program that goes from pre-k to grade 6. In the pre-k classroom, the curriculum is more focused on readiness, which includes prewriting and the basics of handwriting.. Zaner Bloser focuses on shape, size, spacing and slant, and correct letter formation; these keys are in every lesson and level to promote better handwriting development. Students also learn proper posture, paper position, and pencil grip. This program recommends to practice every day for about 15 minutes (Zaner-Bloser, 2016).

Overall these curriculum programs offered a variety of approaches and opportunities to develop the students' handwriting skills and that support the teachers' instructional objectives. Researchers mentioned that despite the availability of these programs, few research has been conducted on the efficacy of these curriculum programs to improve children's handwriting performance (Engel et al., 2018).

**Conclusion**

The literature review studied for this capstone provides strong evidence of the needs for this project. One article relevant for this capstone project is the "Teachers' Perceptions of Needs and Supports for Handwriting Instruction in Kindergarten" conducted by researchers Nye and Sood. In this study, it was supported that the role of the teacher is significant during the intervention. Nye and Sood recommended that the OTs should serve as a coaching figure for the teacher when it comes to enhancing the teacher's knowledge of handwriting strategies, which she can translate to improve the skills of her students. The results showed that the lack of a curriculum and a formalized training is one of the gaps that the teacher has (Nye & Sood, 2018).

The occupational therapist needs to provide support to the teacher in order to optimize effectiveness of the intervention and the development of the teacher's students.

Another study that is relevant for this capstone is Case-Smith, J.'s study (2000) as she analyzed the effects of occupational therapy services on fine motor and functional performance in preschool children. Her finding demonstrated the existing correlation with fine motor skills and functional performance of preschool children. Also, the frequency of occupational therapy services is fundamental in obtaining better outcomes during the occupational therapy intervention.

The new knowledge acquired in this literature review guided the purpose of this capstone project and provided me a better perspective on the goals of the capstone.

## Section 3: Methods

### Project Design

This quasi-experimental research was designed to measure one selected group, using pretest-posttest outcomes to evaluate the effect of implementing a structured early writing plan in the preschool as an early intervention for preschool-aged children (3-5 years) with and without developmental delay. The study used a convenience sample of participants that were not selected randomly. There was not a control group. All of the participants were a part of the experimental group.

### Setting and Participants

Participants in this study were a total of 12 children, specifically 8 boys and 4 girls with and without developmental delay. The project was serviced to children that were enrolled in the half-day Developmental Preschool classroom in a suburban area. The children that were enrolled in the project attended school five days a week. On Mondays, students attended school for 1.45 hours, and from Tuesday to Friday the students attended for 2.45 hours per day. The participants of the researcher's project received the intervention from Tuesday to Friday.

The criteria of inclusion for the experimental group participants was the following: 1) were preschool aged (3-to 5), 2) attended the morning or afternoon preschool class, 3) were with or without developmental delay, 4) were enrolled in the preschool developmental class.
An expedited internal review board (IRB) was submitted to Eastern Kentucky University IRB and it was approved.

Parent consent forms were distributed to parents of the children that participated in the program. All the parents or guardians of the children returned the signed consent. Also, the research department of the School District approved that this project was applied in the preschool classroom. The classroom was adequate to provide multiple opportunities of writing in all the areas of the preschool, in the housekeeping area, in the math center, in the writing center, there

was also a postcard area where the children pretended to write letters and put them in the mailbox.

**Intervention**

All of the children in the experimental group received classroom instructions on specialized handwriting practices and emerging literacy for four days a week, 20 minutes per day for a duration of 2 weeks. The plan initially was for the program to last 6 weeks but due to the outbreak of the COVID-19, and the closing of the school, the program was shortened to 2 weeks. All the students were pre tested and post tested with assessments, students work samples, and classroom observations.

The students also received emerging literacy as part of the curriculum. During circle time and centers, the children received literacy knowledge that included alphabet knowledge, name writing and print knowledge. The program included all forms of writing, such as scribbling, drawing, letter formation, letter-like shapes, and letters. The intervention included multisensory activities such as hand and finger stretching exercises, playdough activities, etc. In addition, children received support with letter knowledge and decoding. The goal was for the children to become familiar with identifying letters, which would motivate them to begin to write. This was included in the lesson plan and curriculum to ensure consistency and blinding procedures.

When developing this project, the classroom was supplied with more writing opportunities in the classroom areas with exercises in art, drama, math, writing, and also with many multisensory and object manipulation activities. All of the areas were provided with sheets of paper and with writing tools, such as pencils, crayons, markers, color pencils, chalk, whiteboards markers. By intentionally implementing more writing materials into the curriculum, the teacher is naturally influenced to elevate the student's engagement into writing and thus further develop early writing skills (Bingham, Quinn, McRoy, Zhang, & Gerde, 2018).

As part of their daily routine for reading, the children received early literacy concepts.

For example, the students explored the books and imitated reading out loud. The teacher guided them in how to handle the books, and went over parts of the books, like the front cover, the back, the title, the author, and how to turn the pages. Children explored books and mimic read everyday for about 5 to 8 minutes.

A certificated special education teacher who is also an occupational student (the researcher) supported the children in the classroom. The special education teacher that incorporated the program in the daily lesson included handwriting and prewriting activities into the lesson plans such as fine motor strength activities, eye-hand coordination exercises, pincer grasp, in hand manipulation, thumb opposition, finger isolation, hand arches, bilateral coordination and crossing the middle line. As part of the curriculum, there were multisensory activities, games, and kinesthetics to support the children's fine motor skills.

The classroom curriculum followed the Early Childhood Education Learning Standards and worked toward the goals of school readiness. They also used Houghton Mifflin Splash into the Pre K-curriculum which followed the standards to support the kindergarten standards. The classroom had multisensory materials from the Learning Without Tears (LWT) program, which were used during the intervention of this project to support children’s handwriting development. The LWT tool kit included a set of letter wood pieces, a sponge cube, slate chalkboard, and a workbook. Once a week during centers and small groups, the teacher used the wooden letters to support students with learning uppercase letter formation, shape, and names of the letters. Students used crayons to write and color on the workbooks. The slate chalkboard was another useful tool to practice letter formation in the correct direction, and for that the student used little chalk to help them to develop their pincer grip. In addition to utilizing the LWT workbook, the writing lessons incorporated whiteboards as a medium to draw people, figures, and to copy

shapes and lines on. Students were encouraged to write their name or first letter of their name, to copy from a sample, or to trace with teacher support. Each student received the appropriate accommodations and support according to their individual needs. The students received support in how to hold the crayon and where to place the paper or medium.

**Data Collection Methods**

This study used the following data collection assessments from the Learning Without Tears Pre-k Assessments (appendix A), which are the Readiness & Writing 1:1 Pre-k Assessment; the Readiness & Writing Observation Checklist, and the Language & Literacy: 1:1 Assessment for naming capital letters and lowercase letters. To collect the data the study used the LWT observational instrument, the Readiness & Writing Observation Checklist, which examined the literacy skills of the children based off of their work, skills such as being able to write their name, spelling accuracy, stage of writing they are currently in, their ability to perform activities that involve fine motor strength, eye-hand coordination, pincer grasp, in hand manipulation. The checklist was scored (0) if the child does not have the skill, (1) if the child was still working on developing that skill, and (2) if the child was proficient in the skill. The checklist consisted of 12 items, and each item was pre and post test

The statistical data analysis that was used was the Wilcoxon Signed Rank Test to compare pre-test (baseline) and post-test (after 2-weeks intervention) results of the group (experimental group).

**Outcomes Measure**

All of the students that participated in the program were evaluated pre and post using the LWT Check Readiness, the Language & Literacy Assessment, and the Readiness and Writing and Language & Literacy observation checklist. The teacher also used the work samples to obtain more data with the writing development, letter formation and drawing of a person and try to write their name.

## Data Analysis

The data obtained from the Learning Without Tears Pre-K assessments and the Readiness & Writing Observation Checklist would be analyzed through a comparison of the pre and post tests based on the work samples, observations, and statistical analysis. The analysis of the checklist performance questionnaire identified the children's level of their hand skills for a specific task or play activity.

## Validity

A potential threat to the internal validity was the maturation of the children. The children may mature or change during the implementation of the program because of external factors. In order to minimize the maturation threat, this program was implemented in a short time period, originally 6 weeks. Another external validity threat was that the preschool developmental class included children with diverse disabilities; therefore, the program was modified according to each setting and the children's needs. Another potential threat to validity could have been that some children would not continue in the program because they might have changed schools. To minimize this threat, the parents would be informed of the benefits of the program to motivate them to keep their child in the school.

## Ethical Considerations

This study was approved by the Institutional Review Board (IRB) at Eastern Kentucky University. In order to warrant the integrity of the study, prior to the beginning of the study the parents/caregivers were required to sign consent forms allowing their children to participate in this study. It was important to follow the codes of ethics that are recommended by the American Occupational Therapy Association (AOTA). According to AOTA (2015) "the Code is an

official document and a public statement that outlines Standards of Conduct the public can expect from those in the profession" (p.1).

It was hypothesized that all of the participants would benefit from the program. The study respected everyone's rights, cultures, gender, values, religious or other differences. All the rights of the participants were kept private and protected in the study. According to Marshall & Rotimi (as cited in Mattew-Lopez & Watson, 2004 ), respect is an ethical principle for the persons that "refer to the expression of self-determination and freedom of choice by individuals" (p.10). For collecting data, it was necessary to ensure that the information collected was accurate and well accounted for (Creswell & Creswell, 2018).

**Timeline of Project**

Table 1. Timeline

| **Capstone Project Timeline** | |
|---|---|
| **Time Frame** | **Capstone project Implementation** |
| November 2019 | Completed CITI Training Basic Course |
| December 2019 - January 2020 | Submitted the application to the school district |
| February 2020 | Obtained IRB approval from EKU |
| | Obtained permission from the school district |
| | Obtained signed parent consent forms |
| March 2020 - April 2020 | Program Implementation |
| | Analyzed data and wrote report |

## Conclusion

The intervention took place within a 2 week period. Data was collected through various assessments recorded before the intervention and after the intervention. Since, the classroom setting consisted of participants from various ages, disabilities, and backgrounds, ethical considerations were placed and the study conformed to the needs of every student. Validity Threats were accounted for and an attempt to prevent them were made. The data analysis will consist of comparisons between the pre and post tests via statistical analysis (Wilcoxon Signed Rank Test) and based on work samples, the checklist scores, and investigator observations. All of these procedures further the investigators goal of testing the hypothesis.

## Section Four: Results and Discussion

### Introduction

The purpose of this capstone project was to evaluate the effectiveness of implementing a structured early writing plan in the preschool classroom that promotes writing development, print concepts and alphabet knowledge of preschool children from 3 to 5 years old. Studies have found that children in early childhood classrooms did not receive enough support and opportunities to develop their writing skills (Bingham et al., 2018). According to Nye & Sood (2018) there is a gap in the teacher to use strategies that support children to develop the skills to enhance their writing skills.

### Results

The objective of this capstone project was to identify if providing extended learning opportunities in handwriting, letter knowledge, and print concepts into the preschool classroom lessons would enhance the emerging writing skills of preschool children with and without disabilities.

### Demographics

Figures 1 and 2 represent the participants' demographic. Twelve children participated in this handwriting program, eight children and four girls with a mean age of 4.4. They received intervention for over a period of two weeks (four days a week) for 20 minutes daily.

Figure 1. Participant demographics by age

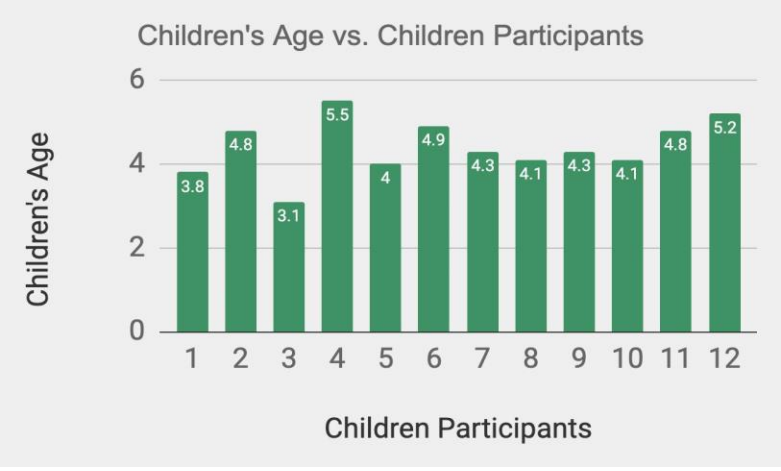
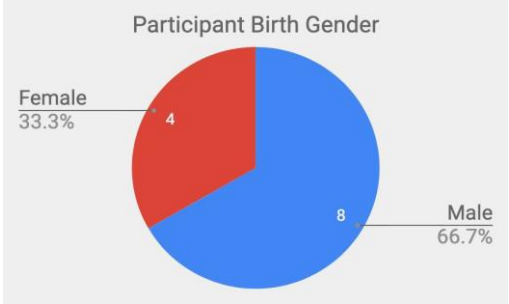



Figure 2: participants demography by gender



**Result of LWT Pre and Post Test**

For this pilot study with a small sample size of students, a non-parametric test was utilized. The Wilcoxon signed rank test was used to analyze the data of the pre and post test LWT. This test analyzed the significance difference between the result of the pre test and post test, after the students receive an intervention for a total of two weeks (4 times a week). A summary of the statistical output from the WSRT can be seen in the appendix B.

Table 2. Wilcoxan Signed Rank Test Statistics

| **Item** | **Get Set for School®<br>Readiness & Writing: Observation Checklist** | **Test Statistics[a]<br>Z-Value** |
|---|---|---|
| 1 | Participates in songs, finger plays, and class activities | -1.000[b] |
| 2 | Demonstrates self care skills and desire for independence (washes hands) | .000[c] |
| 3 | Plays cooperatively, using words to resolve most conflicts (sharing) | .000[c] |
| 4 | Follows direction for class routines and transitions | .000[c] |
| 5 | Says the alphabet and counts to 10+ | .000[c] |
| 6 | Uses names for colors, shapes, letters, and numbers in play and conversation | -1.000[d] |
| 7 | Establishes hand preference and uses correct grip for coloring and writing | -.577[d] |
| 8 | Holds paper with helping hand when coloring, drawing, and writing | -1.000[b] |
| 9 | Traces and copies shapes, letters, and numbers, using correct formation habits | -1.000[b] |
| 10 | Draws generally recognizable pictures using simple shapes and lines | -1.000[b] |
| 11 | Writes name with left-to-right directionality | .000[c] |
| 12 | Writes letter-like forms, letters, or scribbles to represent words and ideas | -1.414[b] |
| **Item** | **Get Set for School®<br>Language & Literacy: Observation Checklist** | **Test Statistics[a]<br>Z-Value** |
| 13 | Listens and responds to directions and questions | -1.000[d] |
| 14 | Engages in conversations using sentences | -1.732[b] |
| 15 | Uses words to express feelings and needs | -1.000[b] |
| 16 | Understands important signs in our environment | -1.000[b] |

| | | |
|---|---|---|
| 17 | Recognizes parts of a book<br>(front cover, back cover, title, pictures, words) | **-2.000[b] *** |
| 18 | Imitates reading books<br>(front to back, turns pages 1 by 1) | -1.000[b] |
| 19 | Recognizes own name and/or names of friends and family in print | -1.414[b] |
| 20 | Predicts what will happen next in a story | -.577[b] |
| 21 | Retells a familiar story (beginning, middle, end) | .000[c] |
| 22 | Tells steps for a simple activity (take a bath, make a sandwich) | -1.342[b] |
| 23 | Chooses books for areas of interest and uses specific vocabulary to talk about them | .000[c] |
| 24 | Uses pictures and play writing to express words and ideas | -1.732[b] |

*p<0.05

Table 3. Non Parametric results from LWT the Readiness & Writing Observation Checklist, and the Language & Literacy: 1:1 Assessment

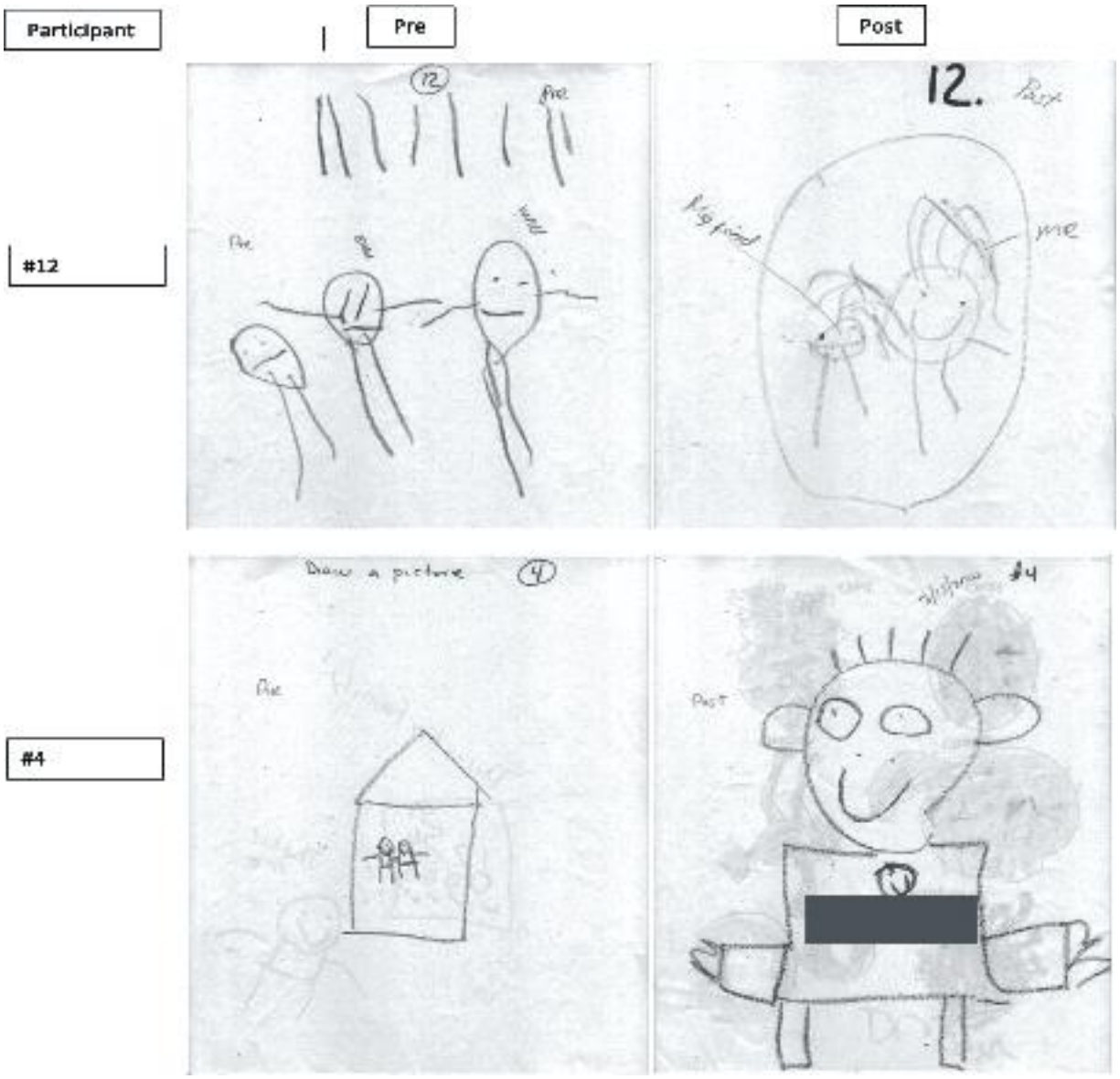
| Checklist Item | Z | P-Value |
|---|---|---|
| 17. Recognizes parts of a book | -2.000 | .046* |

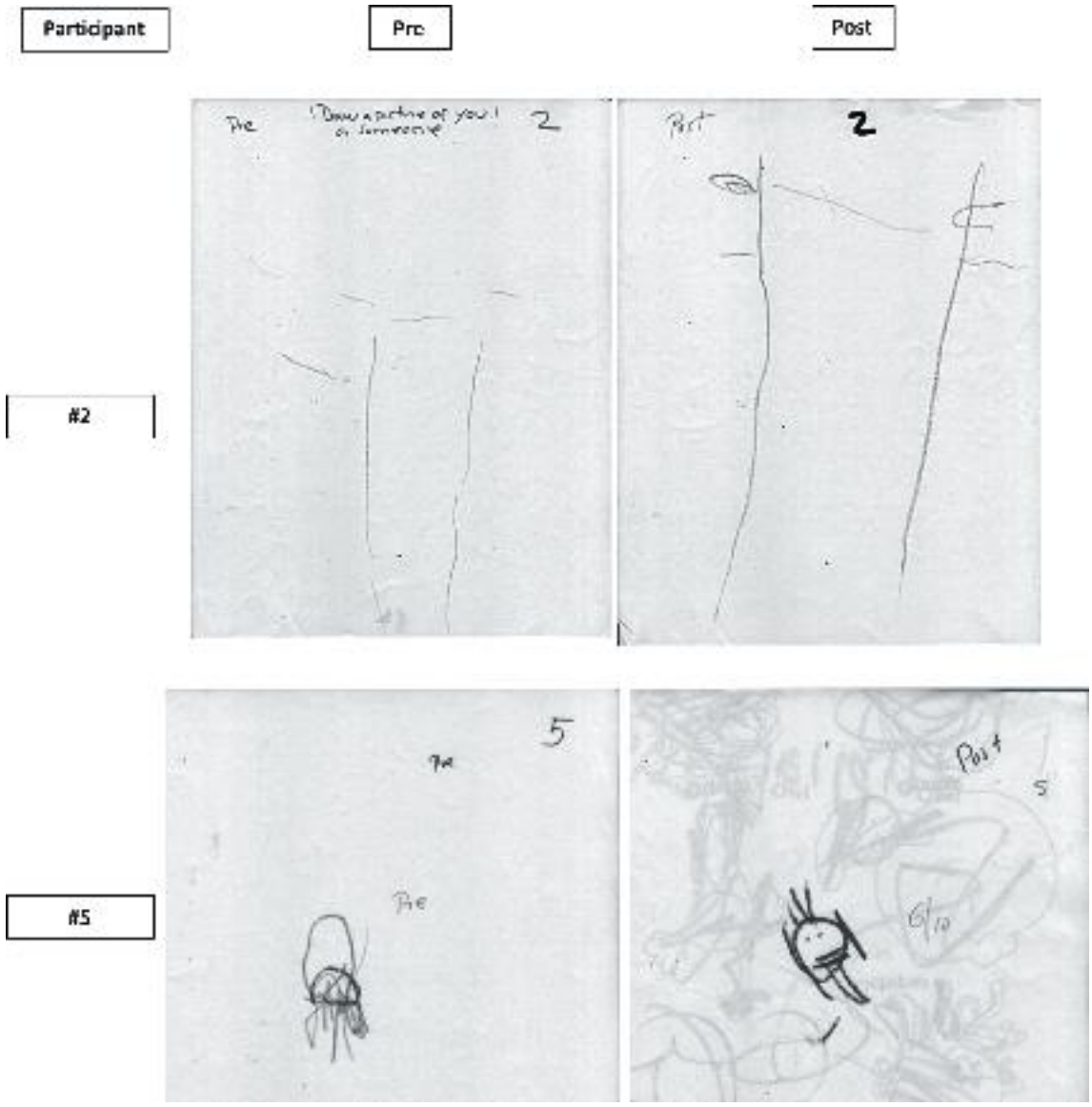
* = p < .05

This study data shows that the children significantly improved in the recognition of the parts of the books in a value *** = p < .05 (-2.000 *) .** This is part of the Language & Literacy goals.

Figure 3: Check Readiness Student Work Samples

PRE VS POST STUDENT WORK SAMPLES: ITEM #7 Draw a Person






## Discussion

To recap, the null Hypothesis (Ho) states there is no significant difference in the emerging writing skills of the children with and without developmental delay after receiving intervention. The alternative hypothesis (Ha) states there is a significant difference in the emerging writing and literacy skills of the children after the children receive the intervention.

The result of the Wilcoxon signed rank test (as seen in Table 2) indicated that the post-test ranks were not statistically higher than the pre-test ranks, except for 1 of the 24 items of the LWT assessment, specifically item #17, which has a p-value of 0.046. We failed to reject the Ho for all pre and post tests, except for item 17 due to its p-value being .046 and $p<0.05$; therefore, for this particular item #17, the data does reject the Ho and we can accept that there was an improvement in the children's emerging and literacy skills after the intervention. This item was a measurement that indicated if the child was able to identify the different parts of the books (front cover, back cover, title) after two weeks of intervention.

Although the assessment data analysis did not exhibit a significant difference in the check readiness or language literacy, the students' works samples (Figure 3) served as evidence of their positive progress during the intervention of this capstone. Three children improved their skills in attempting to stay inside the lines when coloring, four children exhibited progress when drawing a person, one student was able to draw extra body parts. Two students were able to write their name with more precise letter formation and shapes. The improvement of the children's handwriting skills demonstrate that the program was preparing children to draw more pictures and shapes. They were beginning to develop their handwriting technique and to build endurance when coloring.

As seen in Figure 3, when comparing the work of the students before and after the intervention, they were able to meet more of the standards for the Check Readiness. In addition, based on the investigator's observations, who was both the teacher and the occupational therapist for these students, the investigator noticed clinical differences and improvement amongst some of the students.

## Limitations

This project had multiple limitations that should be noted. One of the main limitations was the premature termination of the project. This project was planned to be implemented in six weeks but because of COVID-19, the project was shortened to two weeks. A concern with the Wilcoxon results is that the shortening of the total intervention duration from 6 weeks to 2 weeks due to the COVID-19 epidemic led for the data to only represent changes within a 2 week period; therefore it is probable that after a 6 week intervention, the results of the Wilcoxon exam would have presented a larger statistical difference between the pre and post results and supporting to reject Ho. Another limitation was the attendance of the children. Two children did not attend for about a week, and some children were absent because of the news about COVID-19. However, this project was provided for two continuous weeks as planned.

## Future Implications

The intent of this study was to demonstrate that providing early writing activities and using a structured plan to promote writing development, print concepts, and alphabet knowledge of preschool children will improve their writing skills. The hope of this pilot study was to develop more handwriting skills in all preschool children with and without disabilities. Future studies in this field should continue implementing an early writing program with more multiple handwriting opportunities in the preschool classroom. In the future, this study can be modified and redone for a longer duration to acquire more data and for there to be a larger impact to student's abilities. Also, this study can form a strong basis for similar school based studies in the future relating to pre-writing, emerging writing, and writing for children. These studies will support preschool teachers to implement more literacy and handwriting opportunities into the

classroom curriculum and lesson plans. If more of these studies are done that support the need for educational programs, then teachers can be more trained in how to provide effective emerging writing opportunities to preschoolers. In whole, promoting writing to preschool children is an essential need that must be implemented in all preschool and pre k school classrooms. Children that receive early writing practice opportunities enhance their writing skills. Emerging literacy and early writing must be connected and provided to the students as a method of intervention in the classroom curriculum. Mackenzie (2008, as cited in Al-Maadadi & Ihmeideh, 2016) explains that early writing is connected with language development. When children struggle with writing, it is necessary to support them with multiple strategies. The occupational therapist must encourage and train preschool teachers to provide multiple opportunities of writing in the classroom and set it as a program of intervention.

**Summary**

In conclusion, this project examined whether providing more learning opportunities in handwriting, letter knowledge, and print concepts the preschool children enhanced their early writing skills. This study was affected due to the international COVID-19 outbreak that caused the school in where this study was being conducted to be prematurely terminated from 6 weeks to 2 weeks. The analysis of the results obtained from the Wilcoxon Signed Rank (Table 2) showed that we failed to reject the Ho for all pre and post tests, except for item 17 in the LWT Readiness & Writing Observation Checklist due to its p-value being .046 and $p<0.05$. This represents that there was a statistical significance in the children's progress for item #17, which was recognizing book parts. When analyzing the work samples acquired from the students in Figure 3, students were able to complete more of the criteria from the Check Readiness packet,

specifically being able to draw a person. The investigator noticed that there were clinical differences in the participants' writing, but there didn't turn out to be much of a statistical difference, and this is due to the effect COVID-19 had on the duration of the study.

In whole, promoting writing to preschool children is an essential need that must be implemented in all preschool and pre k school classrooms. Children that receive early writing practice opportunities enhance their writing skills. Emerging literacy and early writing must be connected and provided to the students as a method of intervention in the classroom curriculum. Mackenzie (2008, as cited in Al-Maadadi & Ihmeideh, 2016) explains that early writing is connected with language development. When children struggle with writing, it is necessary to support them with multiple strategies. The occupational therapist must encourage and train preschool teachers to provide multiple opportunities of writing in the classroom and set it as a program of intervention.

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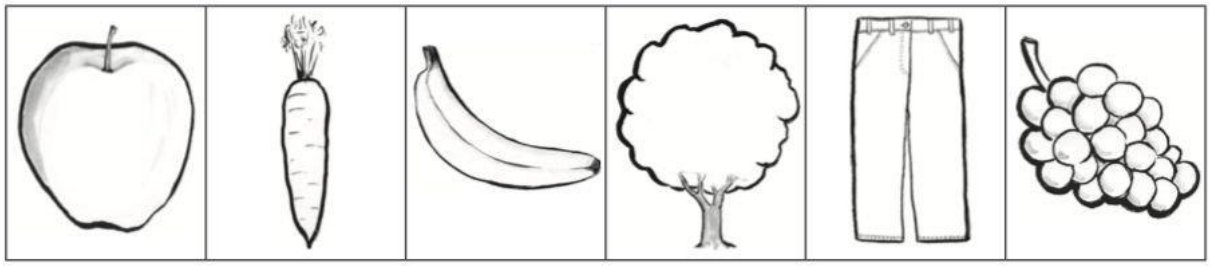
# Appendix A

## Learning Without Tears Pre-k Assessments

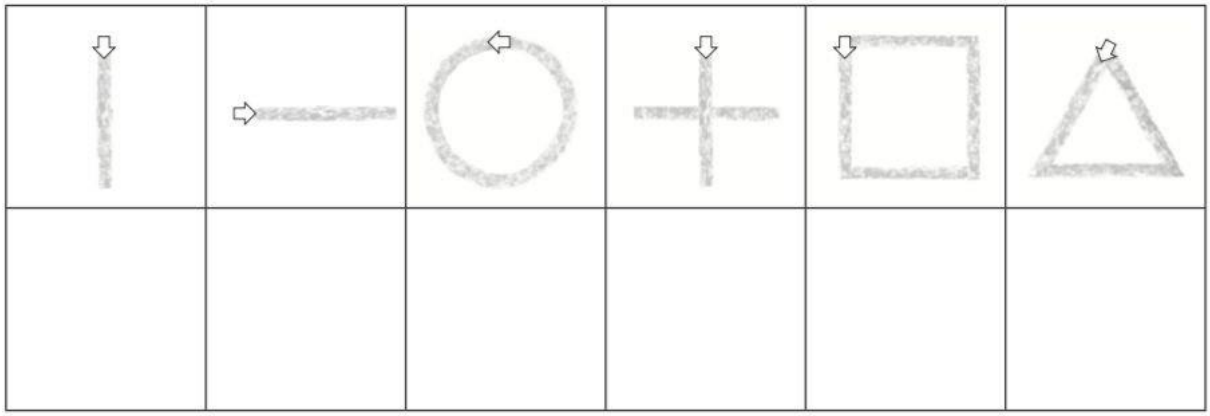
**CHECK READINESS** (See the Pre-K teacher's guide.)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. **Name six Pictures** | Ask, "What is this?" | Apple____ | Carrot____ | Banana____ | Tree____ | Jeans/Pants____ | Grapes____ |
| 2. **Name six Colors** | Ask, "What color is this crayon?" | Red____ | Orange____ | Yellow____ | Green____ | Blue____ | Purple____ |
| 3. **Color two Pictures** | Child uses "fill-in" coloring: | Yes____ | Somewhat____ | Not Yet____ | | | |
| | Attempts to stay in lines: | Yes____ | Somewhat____ | Not Yet____ | | | |

4. **Crayon Grip** Standard____ Alternate____ Palm____ **Hand Preference** L____ R____ ?____ **Holds Paper While Coloring** Yes____ Sometimes____ No____



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. **Name and Trace Shapes** | Ask, "What is this?" | Line_____ | Line_____ | Circle_____ | Cross_____ | Square_____ | Triangle_____ |
| 6. **Copy Shapes** | Tell child, "Copy this here." | Line_____ | Line_____ | Circle_____ | Cross_____ | Square_____ | Triangle_____ |



CHECK READINESS for Pre-K Teacher's Guide, pg. 74

Name_____ Date_____

7. **Draw a Person** Use a blank page. Name and date the page. Say, "Draw a picture of you or someone else. Draw the whole person."
Head_____ Eyes_____ Nose_____ Mouth_____ Ears or Hair_____ Body_____ Arms_____ Hands_____ Legs_____ Feet_____
Extras? _____

8. **Name 10 Letters** Ask, "What letter is this?" E_____ O_____ A_____ T_____ N_____ S_____ H_____ I_____ L_____ R_____

E O A T N S H I L R

9. **Name 10 Numbers** Ask, "What number is this?" 3_____ 5_____ 1_____ 4_____ 8_____ 2_____ 10_____ 6_____ 7_____ 9_____

3 5 1 4 8 2 10 6 7 9

10. **Try to Write Name** Say, "Write your name here. Use capital letters." Put a dot where child begins each letter.

**Get Set for School®**
**Readiness & Writing: Observation Checklist**

**Directions:**
1. Fill in child's name.
2. Fill in observation date.
3. Mark child's progress.

| | | Child's Name | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. Participates** Participates in songs, finger plays, and class activities | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **2. Demonstrates** Demonstrates self care skills and desire for independence (washes hands) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **3. Plays** Plays cooperatively, using words to resolve most conflicts (sharing) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **4. Follows** Follows direction for class routines and transitions | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **5. Says** Says the alphabet and counts to 10+ | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **6. Uses** Uses names for colors, shapes, letters, and numbers in play and conversation | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **7. Establishes** Establishes hand preference and uses correct grip for coloring and writing | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **8. Holds** Holds paper with helping hand when coloring, drawing, and writing | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **9. Traces** Traces and copies shapes, letters, and numbers, using correct formation habits | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **10. Draws** Draws generally recognizable pictures using simple shapes and lines | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **11. Writes** Writes name with left-to-right directionality | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **12. Writes** Writes letter-like forms, letters, or scribbles to represent words and ideas | mark | | | | | | | | | | |
| | date | | | | | | | | | | |

**Progress Marks**

– early, emerging

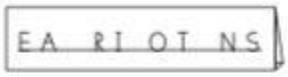
✓ growing

✓+ meets expectation

**getsetforschool.com/assessments**

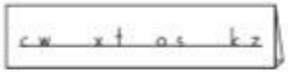
**Get Set for School®** **Language & Literacy: 1:1 Assessment Record**

Name _____ DOB _____ Date _____




**1. Name Capitals**
EA RI OT NS LUC DMP HGK YFW BQV XJZ

Notes _____




**2. Name Lowercase Letters**
cw xt os kz uba yhg vjr mde ipn fql

Notes _____

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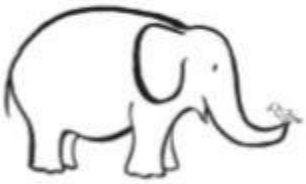

**3. Describe and Compare**
Elephant is big, bird _____ uses trunk, bird _____
trunk is long, bird's beak _____ has 4 legs, bird _____
is heavy, bird _____ can walk, bird _____
trumpet sound, bird _____

Notes _____

---




**4. Nursery Rhymes & Rhyming**
**Repeat** ❑ One, two, tie my shoe ❑ Jack and Jill ❑ Humpty Dumpty
**Rhyme or not** ❑ bear/ dog ❑ bear/chair ❑ chair/cat ❑ chair/bear
**Rhyme find** ❑ hat ❑ frog ❑ log ❑ hair ❑ mat

Notes _____

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**5. Words**
What is this? ❑ car ❑ banana ❑ backpack ❑ jacket

Which one do people drive?
Which one is used for carrying things? _____

Which one can people eat? _____
What foods do you eat? _____

Which one do people wear? _____
What clothes do you wear? _____

**6. Word Parts**

| | | | |
|---|---|---|---|
| **Compound words** | ❑ hot + dog | ❑ back + pack | ❑ cup + cake |
| **Syllables** | ❑ ap + ple | ❑ car + toon | ❑ jack + et |
| **Onset – Rime** | ❑ /s/ + it | ❑ /r/ + un | ❑ /k/ + ar |

Notes _____

**Get Set for School®**
**Language & Literacy: Observation Checklist**

**Directions:**
1. Fill in child's name.
2. Fill in observation date.
3. Mark child's progress.

| | | Child's Name | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. Listens** Listens and responds to directions and questions | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **2. Engages** Engages in conversations using sentences | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **3. Uses** Uses words to express feelings and needs | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **4. Understands** Understands important signs in our environment | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **5. Recognizes** Recognizes parts of a book (front cover, back cover, title, pictures, words) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **6. Imitates** Imitates reading books (front to back, turns pages 1 by 1) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **7. Recognizes** Recognizes own name and/or names of friends and family in print | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **8. Predicts** Predicts what will happen next in a story | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **9. Retells** Retells a familiar story (beginning, middle, end) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **10. Tells** Tells steps for a simple activity (take a bath, make a sandwich) | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **11. Chooses** Chooses books for areas of interest and uses specific vocabulary to talk about them | mark | | | | | | | | | | |
| | date | | | | | | | | | | |
| **12. Uses** Uses pictures and play writing to express words and ideas | mark | | | | | | | | | | |
| | date | | | | | | | | | | |

**Progress Marks**

– early, emerging

✓ growing

✓+ meets expectation

# Appendix B

## Wilcoxon Signed Ranks Test Results

**Ranks**

| | | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| 1post - 1pre | Negative Ranks | 0[a] | .00 | .00 |
| | Positive Ranks | 1[b] | 1.00 | 1.00 |
| | Ties | 11[c] | | |
| | Total | 12 | | |
| 2post - 2pre | Negative Ranks | 0[d] | .00 | .00 |
| | Positive Ranks | 0[e] | .00 | .00 |
| | Ties | 12[f] | | |
| | Total | 12 | | |
| 3post - 3pre | Negative Ranks | 0[g] | .00 | .00 |
| | Positive Ranks | 0[h] | .00 | .00 |
| | Ties | 12[i] | | |
| | Total | 12 | | |
| 4post - 4pre | Negative Ranks | 0[j] | .00 | .00 |
| | Positive Ranks | 0[k] | .00 | .00 |
| | Ties | 12[l] | | |
| | Total | 12 | | |
| 5post - 5pre | Negative Ranks | 0[m] | .00 | .00 |
| | Positive Ranks | 0[n] | .00 | .00 |
| | Ties | 12[o] | | |
| | Total | 12 | | |
| 6post - 6pre | Negative Ranks | 1[p] | 1.00 | 1.00 |
| | Positive Ranks | 0[q] | .00 | .00 |
| | Ties | 11[r] | | |
| | Total | 12 | | |
| 7post - 7pre | Negative Ranks | 2[s] | 2.00 | 4.00 |
| | Positive Ranks | 1[t] | 2.00 | 2.00 |
| | Ties | 9[u] | | |
| | Total | 12 | | |
| 8post - 8pre | Negative Ranks | 0[v] | .00 | .00 |
| | Positive Ranks | 1[w] | 1.00 | 1.00 |
| | Ties | 11[x] | | |
| | Total | 12 | | |
| 9post - 9pre | Negative Ranks | 0[y] | .00 | .00 |
| | Positive Ranks | 1[z] | 1.00 | 1.00 |
| | Ties | 11[aa] | | |
| | Total | 12 | | |
| 10post - 10pre | Negative Ranks | 0[ab] | .00 | .00 |
| | Positive Ranks | 1[ac] | 1.00 | 1.00 |
| | Ties | 11[ad] | | |
| | Total | 12 | | |
| 11post - 11pre | Negative Ranks | 0[ae] | .00 | .00 |
| | Positive Ranks | 0[af] | .00 | .00 |
| | Ties | 12[ag] | | |
| | Total | 12 | | |
| 12post - 12pre | Negative Ranks | 0[ah] | .00 | .00 |
| | Positive Ranks | 2[ai] | 1.50 | 3.00 |
| | Ties | 10[aj] | | |
| | Total | 12 | | |
| 13post - 13pre | Negative Ranks | 1[ak] | 1.00 | 1.00 |
| | Positive Ranks | 0[al] | .00 | .00 |

| | | | | |
|---|---|---|---|---|
| | Ties | 11[am] | | |
| | Total | 12 | | |
| 14post - 14pre | Negative Ranks | 0[an] | .00 | .00 |
| | Positive Ranks | 3[ao] | 2.00 | 6.00 |
| | Ties | 9[ap] | | |
| | Total | 12 | | |
| 15post - 15pre | Negative Ranks | 0[aq] | .00 | .00 |
| | Positive Ranks | 1[ar] | 1.00 | 1.00 |
| | Ties | 11[as] | | |
| | Total | 12 | | |
| 16post - 16pre | Negative Ranks | 1[at] | 1.00 | 1.00 |
| | Positive Ranks | 0[au] | .00 | .00 |
| | Ties | 11[av] | | |
| | Total | 12 | | |
| 17post - 17pre | Negative Ranks | 0[aw] | .00 | .00 |
| | Positive Ranks | 4[ax] | 2.50 | 10.00 |
| | Ties | 8[ay] | | |
| | Total | 12 | | |
| 18post - 18pre | Negative Ranks | 0[az] | .00 | .00 |
| | Positive Ranks | 1[ba] | 1.00 | 1.00 |
| | Ties | 11[bb] | | |
| | Total | 12 | | |
| 19post - 19pre | Negative Ranks | 0[bc] | .00 | .00 |
| | Positive Ranks | 2[bd] | 1.50 | 3.00 |
| | Ties | 10[be] | | |
| | Total | 12 | | |
| 20post - 20pre | Negative Ranks | 1[bf] | 2.00 | 2.00 |
| | Positive Ranks | 2[bg] | 2.00 | 4.00 |
| | Ties | 9[bh] | | |
| | Total | 12 | | |
| 21post - 21pre | Negative Ranks | 0[bi] | .00 | .00 |
| | Positive Ranks | 0[bj] | .00 | .00 |
| | Ties | 12[bk] | | |
| | Total | 12 | | |
| 22post - 22pre | Negative Ranks | 0[bl] | .00 | .00 |
| | Positive Ranks | 2[bm] | 1.50 | 3.00 |
| | Ties | 10[bn] | | |
| | Total | 12 | | |
| 23post - 23pre | Negative Ranks | 0[bo] | .00 | .00 |
| | Positive Ranks | 0[bp] | .00 | .00 |
| | Ties | 12[bq] | | |
| | Total | 12 | | |
| 24post - 24pre | Negative Ranks | 0[br] | .00 | .00 |
| | Positive Ranks | 3[bs] | 2.00 | 6.00 |
| | Ties | 9[bt] | | |
| | Total | 12 | | |

# Appendix C

## CITI Training

CITI PROGRAM

Completion Date 30-Nov-2019
Expiration Date 29-Nov-2022
Record ID 34405240

This is to certify that:

**Claudia Ortiz**

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

**Social & Behavioral Research - Basic/Refresher** (Curriculum Group)
**Social & Behavioral Research - Basic/Refresher** (Course Learner Group)
**1 - Basic Course** (Stage)

Under requirements set by:

**Eastern Kentucky University**

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w2e254383-d39d-4e60-bb5b-2237b1b95b2c-34405240