

# Enhancing early children's basic handwriting skills through hands-on participant team teaching: A monadic experimental design

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## Abstract

This study investigated the impact of hands-on participant team teaching (HPTT) on children's basic handwriting skills. Pre-test and post-test were conducted to measure changes in accuracy, correct strokes, consistency, control, grip, independence, and neatness. Initial observations revealed a teaching approach that heavily relied on parental assistance, which raised concerns about the student's proficiency in basic handwriting skills. This monadic experimental study used seven early childhood pupils at a San Jose City, Philippines public school. Three researchers immersed themselves in teaching the selected students using HPTT, after a pre-test followed by a series of interventions then ended with a post-test. Experts validated rubrics used for scoring the pre-test and post-test. Qualitative data were gathered using semi-structured interviews. The pre-test results indicated a substantial deficit in basic handwriting skills. However, following the implementation of HPTT, the mean post-test score substantially increased, underscoring the effectiveness of the team-teaching intervention. Another critical finding is that guidance and personalized support play a pivotal role. Students who receive consistent help, especially in managing strokes and grips, consistently improve their handwriting abilities. This study highlights the impact of structured interventions and personalized assistance in honing handwriting skills. This highlights the potential of HPTT as an effective teaching method for enhancing children's basic handwriting skills. The study underscores the importance of innovative and interactive teaching strategies and calls for further research to explore these findings' long-term effects and generalizability to diverse student populations and settings.

**Keywords:** *collaborative, fine motor skills, early childhood education, Philippines*

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## 1. Introduction

In the dynamic landscape of early childhood education, maximizing young children's educational opportunities is an ongoing task. Among these various aspects of growth and learning, the development of fine motor skills holds a central position (Sutapa et al., 2021). Fine motor skills encompass the adept coordination and mastery of the intricate muscles within the hands and fingers, facilitating the ability of young learners to execute precise, dexterous, and object-manipulating tasks (Mauro, 2022). These skills play a pivotal role in a child's overall development and have lasting implications for their academic and life success (Strooband et al., 2020; Torres, 2022). A research gap exists in the realm of improving handwriting skills among early childhood pupils, particularly within the context of the Philippines. Despite the dynamic landscape of early childhood education, there is a notable lack of studies focused on enhancing the country's early childhood education system. While the importance of fine motor skills, including pencil handling, is acknowledged, there is limited research addressing practical interventions to improve these skills in Filipino early childhood education settings. Closing this gap is essential for maximizing the educational opportunities of young learners and fostering their overall development.

Fine motor skills are the skillful manipulation of objects, tools, and other materials that enable children to create, explore, and interact with their environment (Penfield Children's Center, 2020). It is an indispensable tool for various functional tasks during an individual's daily life (Jarque-Bou et al., 2021). These tasks encompass fundamental activities such as object manipulation (Riddle, 2019), allowing kids to move, do things, and perform everyday tasks. Thus, it is crucial to master foundational fine motor skills, such as pencil handling, during early childhood.

The surge in digital device usage has sparked debates regarding the continued relevance of handwriting skills in contemporary society. Scholars like Billing (2021) suggest that the pervasive use of digital technology could potentially diminish the emphasis placed on traditional handwriting. Consequently, there is a concern that children born in the digital age may exhibit poorer handwriting skills compared to previous generations. Moreover, prolonged exposure to digital devices has been associated with potential drawbacks (Shulman, 2021), including adverse effects on fine motor development in children. This raises concerns about

the impact of excessive screen time on the mastery of fundamental skills such as pencil use, which is a crucial developmental milestone in early childhood.

During a child's formative years, putting more emphasis on purely intellectual activities, such as memorizing letters and numbers, often results in less favorable outcomes than activities that aim to foster fine motor skills and hand-eye coordination (Akin, 2019). A notable research gap exists in exploring the potential consequences of prioritizing purely intellectual activities over those that promote fine motor skills and hand-eye coordination during a child's formative years. While research has demonstrated the importance of activities aimed at fostering fine motor skills, such as handwriting practice, there remains a lack of comprehensive studies assessing the long-term effects of an imbalance in early childhood educational practices. Understanding the implications of this imbalance is essential for informing educational policies and interventions aimed at optimizing children's overall development and academic success. Not only that, the acquisition and refinement of fine motor skills during the early years of education are fundamental to a child's ability to accomplish a wide range of activities, from self-care routines such as buttoning a shirt or tying shoelaces to more complex tasks like drawing, cutting, and handwriting (Lee et al., 2022). A medically reviewed article by Hunter (2023) states that this interconnectedness between motor skills and intellectual growth amplifies the importance of fostering dexterity in early childhood educational settings, among these, handwriting development is a crucial milestone, as it serves as a foundation for literacy and communication skills (Rigg, 2019). Research highlights the vital role of fine motor skills, especially handwriting, in early childhood development. However, gaps exist in understanding their long-term impact on academic and career success, as well as effective strategies for diverse populations. Addressing these gaps is crucial for supporting children's holistic development in which this study does.

Handwriting is a unique skill that combines fine motor control with cognitive processes (Lee et al., 2022), such as letter recognition, spatial awareness, and language acquisition. Proficient handwriting enables young learners to express themselves, communicate their thoughts effectively, and access written information, laying the groundwork for success in formal education and beyond (Gerde et al., 2019; Kim & Nor et al., 2019). Furthermore, research has shown a strong connection between handwriting proficiency and academic performance in reading, writing, and mathematics (Suggate et al., 2023; Suggate et al., 2019).

The act of learning to write by hand not only fosters the development of fine motor skills but also enhances cognitive abilities (Rigg, 2019). This process is integral to cognitive development, highlighting the interconnectedness between physical activity, fine motor skill refinement, and academic success (Kim et al., 2018). Thus, handwriting serves as a foundational skill that not only facilitates idea generation and information retention but also lays the groundwork for future academic achievements.

While there is significant literature emphasizing the importance of early childhood education in developing children's motor skills through methods such as handwriting instruction, there remains a notable gap in research, particularly within the context of the Philippines (Maris, 2023; Main, 2023). Despite evidence suggesting a positive correlation between effective writing skills and academic performance, there is a scarcity of studies investigating the effectiveness of hands-on and team-teaching approaches in enhancing early childhood handwriting skills specifically in the Philippine setting (Sahardin & Nova, 2018). This research gap presents an opportunity to explore how culturally relevant and context-specific teaching methodologies can be implemented to improve the motor skills and academic performance of Filipino children through focused handwriting instruction. Additionally, investigating the feasibility and effectiveness of collaborative teaching methods tailored to the Philippine educational landscape could provide valuable insights for educators and policymakers aiming to enhance early childhood education outcomes in the country. Addressing this gap is essential for developing evidence-based strategies that meet the unique needs of Filipino children in their early educational journey.

## **2. Theoretical Framework**

Two approaches that have gained attention in recent years are hands-on learning and team teaching. Mcilroy (2022) states that hands-on learning involves engaging with real-world materials and objects, fostering exploration and experiential understanding. Hands-on learning, characterized by active physical engagement rather than passive lecture-based instruction, is often considered one of the most effective teaching methods (Bonney, 2021). This approach aligns with John Dewey's theory of learning by doing (Marougkas et al., 2023), emphasizing that learners gain a deeper understanding when actively engaging with the subject matter (Main, 2023). Hence, it is a promising pedagogical approach to enhance the basic handwriting skills of early childhood learners, utilizing innovative pedagogical approaches holds

significant promise in fostering the development of foundational handwriting skills among early childhood learners. By employing methods tailored to the unique developmental needs and capabilities of young children, educators can effectively enhance various aspects of handwriting, including letter formation, pencil grip, and spatial awareness. This is supported by Maris (2023) emphasizing the crucial role of hands-on writing activities in early childhood education, the capacity to promote student engagement, motivation, and knowledge retention. Maris suggests that these tactile experiences serve as valuable tools for educators seeking to enhance overall learning outcomes among young learners. Similarly, Main (2023) corroborates Maris's perspective, emphasizing the significance of hands-on writing tasks in providing students with more meaningful opportunities to interact with the subject matter. Main underscores the importance of integrating hands-on experiences that involve physical manipulation of writing utensils and direct engagement with writing surfaces to foster fine motor skill development and deepen comprehension. Together, Maris and Main advocate for the integration of hands-on writing activities into early childhood education curricula, emphasizing their potential to optimize learning experiences for young students (Maris, 2023; Main, 2023).

Concurrently, the educational strategy of team teaching offers a collaborative approach to instruction that can be particularly impactful in early childhood settings (Grell & Chapel, 2022). This shared teaching approach involves educators working together to instruct the same group of students on a given subject using unified lesson plans, exercises, and resources (Kays, 2022). Emphasizing effective teamwork and a shared educational goal, team teaching fosters the development of teamwork competencies among educators (Rosenfield et al., 2018). Sahardin and Nova (2018) underscore the influence of team teaching in English language instruction, citing its effectiveness in facilitating successful learning outcomes. A study conducted at the University of Texas utilized team teaching to impart reading skills, resulting in students experiencing value in their learning journey and enjoying their progress (Sahardin & Nova, 2018). For early childhood education, incorporating collaborative teaching strategies like team teaching can enrich the learning environment, promote effective teamwork among educators, and ultimately enhance the educational experience for young learners. By combining hands-on writing activities with collaborative teaching approaches, educators can create dynamic and engaging learning environments that cater to the diverse needs of early

childhood students. However, while studies have already explored the use of hands-on learning and participant-team teaching, there needs to be more empirical research on the effectiveness of combined hands-on learning and participant-observer-team teaching in enhancing the basic handwriting skills of daycare center learners, especially in the Philippines. This study uses the hands-on participant-team teaching strategy in a daycare center where certain students struggle with pencil use.

### **3. Methodology**

#### ***3.1 Context of the study***

This study involved 14 young learners, eight males and six females of ages four to five, at a daycare center in the Philippines. They were randomly selected for the study with the approval of the city social warfare and development office, which governs daycare centers in the Philippines and consequently agreed to be part of the study by their parents who signed parental consent and are always near the classroom during the experiment. The study implemented John Dewey's learning-by-doing theory, emphasizing active participation and hands-on experiences to foster curiosity and independence (Pappas, 2023; Manke, 2019). Dewey advocated for environments encouraging questioning and experimentation and nurtured students' creativity and critical thinking (Main, 2023).

#### ***3.2. Role of researcher in the study***

This research study focuses on enhancing preschoolers' handwriting skills through distinct roles and responsibilities assigned to the researchers for smooth implementation and thorough evaluation of the intervention and employing participant-observer team teaching, where faculty alternate teaching responsibilities. In this research setting, Chourasiya (2019) explains that one researcher acts as the primary teacher leading instructional sessions, including number tracing exercises. The second researcher takes charge of classroom management, ensuring active participation and supporting both the primary teacher and learners. Another researcher handles learning materials and organizes resources for the hands-on activities. The remaining three researchers serve as observers and data collectors, documenting implementation progress, participant challenges, and classroom dynamics to evaluate the intervention's effectiveness comprehensively.

### ***3.3 Instruments***

This study employed a pre-test and post-test assessment, a researcher-developed rubric, and a semi-structured interview questionnaire. The pre-test and post-test activities were conducted to measure pupils' progress in number tracing before and after the intervention, utilizing activity worksheet books as the basis for assessment. A seven-classification rubric was designed, evaluating the accuracy, strokes, consistency, control, grip, independence, and neatness on a 1-5 scale to numerically assess pupils' performance, totaling 35 points. The rubric was validated using the instrument validation rating scale by Ryan Michael F. Oducado from West Visayas State University College of Nursing to ensure its reliability and accuracy in assessing learners' papers. The validation results signified adequate content validity with a mean score of 30.25 from the three early childhood experts which include an education specialist from the Department of Education Philippines, an early childhood professor from the College of Education, and a seasoned early childhood teacher. Additionally, a semi-structured interview questionnaire was used among the parents to gather qualitative insights and perspectives complementing the quantitative data from tests.

### ***3.4 Data gathering procedure***

The research methodology comprised a comprehensive approach to assess the impact of hands-on participant team teaching on early learners' handwriting skills. Conducted within a Day Care Center, the study was initiated with pre-observation sessions, focusing on understanding both pupil behavior and teaching methodologies. Researchers, positioned discreetly in the classroom, engaged interactively with pupils to foster a congenial environment. Subsequently, pre-tests were administered to the 16 present learners however due to medical reasons two of the students were unable to attend the three-week immersive implementation phase integrating hands-on learning and team-teaching strategies. Post-implementation, observations, and field notes were gathered, and post-tests were administered to 14 assessed learners. Further, a semi-structured interview was done with three purposely selected parents who agreed to be interviewed and elucidated their perspectives on the study's impact on their children's development. This meticulously crafted research design enabled a comprehensive analysis of the efficacy of the implemented teaching strategies on enhancing early handwriting skills, offering insights into both pedagogical methodologies and parental perceptions.

### 3.5 Data analysis

The research methodology involves observational analysis. This ensures unbiased observations, allowing conclusions to be drawn solely from hands-on activities without manipulating the research subjects. Field notes play a pivotal role in documenting participant behaviors, events, and pertinent details during the study. Descriptive statistics using frequency and percentage were done. The Statistical Package for the Social Sciences (SPSS) was used for data analysis, including mean and standard deviation calculations of pre-test and post-test results, along with a dependent samples t-test to ascertain any statistically significant differences in handwriting skills before and after intervention. Thematic analysis of the interview responses complements the observational data.

## 3. Findings and Discussion

### 4.1. Pre and post testing performance

During the pre-test, 86% of the population needed more expertise in terms of precision in handwriting skills (table 1). One of the participants' mothers supported this result, saying, "his handwriting can be messy, and he tends to get a bit lazy, resulting in some scribbles here and there." The researchers' observation also confirmed that pupils faced challenges properly holding the pencil, affecting their tracing accuracy.

**Table 1**

*Descriptive statistics of the seven dimensions of basic handwriting skills*

Dimensions	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Accuracy	14	1.75	0.85	3.46	0.66
Correct Strokes	14	1.54	0.63	3.32	0.64
Consistency	14	1.57	0.58	2.96	0.82
Control	14	1.79	0.83	3.32	0.64
Grip	14	1.93	1.02	3.57	0.65
Independence	14	1.93	1.14	3.54	0.89
Neatness	14	1.89	0.68	3.75	0.58
<b>Overall Handwriting Skills</b>	14	1.77	0.73	3.42	0.60

*Classification class interval scheme.* Excellent (4.21 – 5); Proficient (3.41 - 4.2); Basic (2.61-3.4); Limited (1.81 - 2.6); Unsatisfactory (1 - 1.8).



All participants needed more fundamental competence regarding accurate strokes in handwriting skills. One of the participants' mothers corroborated this result, who stated, "*he had a hard time with vertical lines and circular curves.*" The observers noted that pupils struggled with starting and ending points during the pre-test, leading to improper stroke sequences while tracing numbers. The findings indicated that only one pupil possessed fundamental competence in uniformity and precision in handwriting skills. This result aligned with the researchers' observation, as the pupil's poor control led to inconsistent and messy tracings.

During the pre-test, 86% of the population also lacked a proper pencil grasp. The observers affirmed this result, noting that pupils had an unstable grip, causing disruptions. Furthermore, 79% of the population needed guidance in tracing activities regarding handwriting skills. This result was supported by one of the mothers of the pupils, who stated, "*he is doing it, but he needs guidance to finish it.*" The observers also agreed that with guidance, pupils could focus more easily. Lastly, 86% of the population needed more competence in tidiness in their handwriting skills. One of the participants' mothers echoed this result, mentioning, "*his handwriting can be messy.*" The observers also noted that pupils had inconsistent and messy tracings. According to Kid Sense Occupational and Speech Therapy (2019), pupils ages 3-4 should already be able to copy circle, horizontal, and vertical lines. By the age of 4-5 years, children should be able to copy square and diagonal lines (States et al., 2018), these lines were the basic strokes that young learners should be able to do. However, most of the 12 remaining pupils performed below the expected level, indicating that most students were experiencing difficulties and delays in basic handwriting skills.

Compared with students' pre-test, 14% of the pupils experienced a 36% increase in their competence in handwriting skills after the intervention. The increase in competence is supported by the actual statement of one of the pupil's mothers: "*There have been some improvements; he can trace faster and has improved his familiarity with numbers, but he still struggles with following the lines correctly.*" Also agreed with the observers, some demonstrate exceptional accuracy, maintaining correct size and displaying precise control. In the pre-test, no one had acquired the basic skills in proper stroke formation, but 50% showed increased mastery after the intervention. One of the pupil's mothers agreed with this result and said, "*there has been a noticeable improvement in his writing.*" The observers support these notes, and the pupil shows improved tracings with reduced scribbles and progress in forming

organized lines. Only one pupil had adequate skills in uniformity. After the intervention, an additional five pupils acquired the uniform level. Supported by the observers' notes, the pupil consistently maintains the correct size, showing reasonable control even with minor wobbles. In the pre-test, one pupil was at the foundational level, but after the intervention, an additional six pupils improved their mastery of handwriting skills. This result is agreed with the observers; a pupil demonstrates a firm and confident grip, allowing him to maintain the correct size and manage minor wobbles effectively.

Moreover, the pre-test revealed that participants needed to gain the essential skills to hold a pencil. However, there was a remarkable improvement following the intervention, with 43% of the pupils enhancing their handwriting skills. It is agreed with the observers that the pupils display a high level of autonomy, adjusting grips and following instructions skillfully. There was a 43% increase in the participants' autonomy level. The increase in autonomy is supported by the actual statement of the mothers of the pupils, where they said: *"She has learned how to write independently, no longer needing constant supervision or guidance as before," "Initially, she was not attentive, but when her teachers began guiding and instructing her, she became more enthusiastic about attending school and learning," "Initially, she used to cry when left alone, but now, with her teachers guiding and building trust, she is happier and more independent. They have formed a strong bond."* Additionally, In the pre-test, only 14% exhibited fundamental abilities in tidiness. However, there was a 43% increase in handwriting competence after the intervention. This is supported by the actual statement of one of the pupil's mothers, who said, *"his handwriting can be messy, and he tends to get a bit lazy, resulting in some scribbles here and there."* As shown in table 1, there is a notable improvement in handwriting skills. No students were at the 'limited' or 'unsatisfactory' remark, which indicates that all students have shown typical development in their handwriting abilities. Paired-sample t-test suggested significant progress from the pre-test results (table 2).

**Table 2**  
*Paired sample t-test of basic handwriting skills*

<b>Dimensions</b>	<b>t</b>	<b>df</b>	<b>sig.</b>
Accuracy	-15.1	13	0
Correct Strokes	-11.5	13	0
Consistency	-10.7	13	0
Control	-9.52	13	0
Grip	-8.55	13	0
Independence	-4.78	13	0
Neatness	-10.1	13	0
<b>Overall Handwriting Skills</b>	<b>-13.1</b>	<b>13</b>	<b>0</b>

#### ***4.2. Themes and patterns observed throughout the interview***

***Theme 1: Guidance and assistance.*** Before initiating the implementation process, some children were seen having a hard time tracing. They need help to write the given worksheets. One of the parents, Zayn's mother, recognized that her child required guidance and assistance when tracing numbers 5 to 10. She said:

*"He is doing it 5 that he held the pencil correctly and knew the start and end points. He improves, and with that, he can be independent because of the guidance of the teachers and when it comes to his paperwork.*

Initially, some of the children lacked attentiveness in the classroom, but with the support and guidance of her teachers, the learners became active inside the classroom. Another parent, Laiza's mother, said:

*"Initially, she was not attentive, but when her teachers began guiding and instructing her, she became more enthusiastic about attending school and learning."*

She explained that her child became more enthusiastic about learning. She can now write independently and confidently; her mother has noticed her child's improvement. Additionally, the observer assigned to the learner noticed that her pre-test during the experimentation could have been better. However, her level could have been more proficient after the implementation process. The researcher observed that after the implementation, there was an improvement in Lyza's performance, particularly in her independence. Lyza displayed remarkable independence during the post-test activity; she could complete it without guidance from her mother or even the assistant teacher, which was quite different from her performance before the implementation.

***Theme 2: Strengthened teacher-pupil interaction.*** The bond between teachers and learners is a fundamental cornerstone of the educational experience (States et al., 2018). It goes beyond the classroom, forming a crucial connection that can profoundly impact a student's learning journey (Strobel Education, 2023).

In the case of Zayn, it is evident that he thrives when encouraged or when provided with engaging activities. Whether overcoming handwriting challenges or improving his overall

skills, his motivation and performance significantly benefit from the support and stimuli that encourage his active participation. Based on the interview, his mother said:

*"He needs to be encouraged or given something to do the activity."*

As per the statement, Zayn requires motivation to engage in and complete an activity. He may not naturally be inclined to start or continue a task independently. To be productive or effective, he needs external support, encouragement, or an enticing element to motivate him to participate and see the activity through to its conclusion. The researcher supports this based on Zayn's result in the pre-test, which is indicated to be different from the pupils' post-test.

In Laiza's case, on the other hand, she used to cry whenever her mother left her side. These moments of separation were undoubtedly challenging. Her mother said:

*"Initially, she used to cry when left alone, but now, with her teachers guiding and building trust, she is happier and more independent. They have formed a strong bond."*

Based on this statement, her mother expresses happiness when she sees her child improve. Through the nurturing care and guidance of the teacher, her child gradually learned to navigate these emotional transitions with increasing grace and composure. Additionally, the best part is that this transformation has not just made her child more secure and independent. As stated by the Hope et al. (2019), it has also strengthened the special bond between the teachers and their students through their teaching methods, fostering trust and love that will stick with them as they continue their learning journey.

Another parent, MJ's mother, explains that there was an enhancement in the teacher-pupil relationship regarding handwriting during the intervention. As mentioned by Mj's mother:

*"I even mentioned to Mj's father that it is like having two teachers teaching him because he can be so stubborn."*

On the pre-test, the researcher found that the student's performance was only rated as unsatisfactory. However, after the experiment, the post-test results showed significant improvement in all aspects of handwriting. As a result, the student's performance is now at a basic level.

**Theme 3: Positive progress.** One of the parents, Zayn's mother, enthusiastically shared that her child has made significant strides, particularly in becoming more familiar with numbers. As her statement goes:

*"There have been some improvements; he can trace faster and has improved his familiarity with numbers, but he still struggles with following the lines correctly."*

Despite encountering minor challenges, she firmly believes that the positive progress she has witnessed can be attributed mainly to the teaching strategies implemented during this process.

Another parent, Laiza's mother, mentioned that in the past, she needed to pay more attention to coloring or which colors to use. However, now she confidently applies the correct colors and enjoys coloring various objects, including fruits, on her worksheets. She said:

*"In the past, she did not pay much attention to coloring or which colors to use, but now she confidently applies the correct colors and enjoys coloring various objects, including fruits, on her worksheets. There has been significant progress."*

Laiza's action was supported by Gerde et al. (2019) and Kim et al. (2019), who stated that proficient handwriting enables young children to express themselves.

The mother also added:

*"There has been significant progress."*

This statement highlights a positive transformation in her child. The shift from indifference to enthusiasm showcases her significant progress in this creative aspect of her life. Under this positive progress, her child has become more independent, and her behavior has changed. She can now complete tasks independently, even when her mother is not by her side.

Furthermore, the researchers stated,

*"Laiza became motivated and now enjoys finishing her tracing activity, even the coloring in her workbook, because the main teacher and assistant teacher provided praise and encouraging words she did not typically receive before the implementation. This positive reinforcement has made a notable difference, as she struggled and got bored, finding it difficult to complete the activities."*

MJ's mother explained that her child had improved significantly because he was not doing what his teacher had asked him to do before. She also mentioned that having two teachers who supported her child, MJ now enjoys doing what he has asked to do alone. When we showed the pre-test and post-test paper to his mother, she exclaimed:

*"MJ, you are doing great!"*

Lastly, Ryanjet's mother stated that:

*"Nevertheless, this approach has yielded positive improvements."*

She explained and expressed her gratitude because the teaching strategies that the researcher used have been advantageous for her child. Initially, her child had difficulty tracing dotted lines and was somewhat lazy; as a result, he scribbled his work. However, after the implementation process and receiving individual attention, her child's behavior improved significantly, and there was a notable increase in handwriting quality.

#### **4.3. Discussion**

The results of this study found a significant increase in children's basic handwriting skills after the implementation of HPTT. The data demonstrate this improvement, as evidenced by the substantial differences between the pre-test and post-test mean scores. Based on observations before implementing team teaching, the researchers noticed the teaching approach; she could not assist her pupils as she relied heavily on their parents. Instead of guiding the pupils, she merely discussed the instructions and expected parents to take charge of their children's learning (States et al., 2018).

The researchers observed the pupils' tracing activities and found they needed proper knowledge of stroke order for numbers. They follow the teacher's instructions unthinkingly and need help understanding the correct strokes. It is important to note that these pupils have been in school for three months, and their level of handwriting skills was still at the 'unsatisfactory' level, which, according to Kids Sense Occupational and Speech Therapy (2019), was supposed to be already at the 'basic' level. Additionally, one of the pupils was seen swapping hands when writing, two showed total avoidance in doing it, some were writing in an untidy way, and most were writing slowly and struggling to write correctly, according to Chourasiya (2019) were signs of early children having a problem in handwriting. These signs, as mentioned by All About Speech and Language (2018), are a possible implication of delayed development and in need of immediate intervention (States et al., 2018).

Nevertheless, the outcomes of the pre-test findings underscore a significant and concerning shortfall in fundamental handwriting abilities within the studied population. The marked deficits in accuracy, consistency, control, independence, and neatness indicate a pervasive issue that demands immediate attention (States et al., 2018). To address this challenge effectively, a multifaceted approach is required. Team teaching strategies can foster a collaborative environment where educators collaborate to enhance handwriting skills, leveraging their collective expertise. A constructive model was incorporated into classroom discussions by the team-teaching teachers. The researchers Crow and Smit (2003) reported that the team-teaching learning atmosphere that the teacher introduced was an essential model for learners. Therefore, the pupils would be affected by this exemplary environment, and they would act as models for these actions when the teachers offered cooperative work and showed that they enjoyed it (Chourasiya, 2019). Individualized coaching can offer personalized guidance to pupils struggling with handwriting. In Vogler and Long's (2003) study, students believed that team teaching benefited them by introducing various perspectives and maximizing chances for personal assistance.

The structured handwriting exercises can target specific areas of weakness and provide systematic practice. These interventions address the immediate issue of legible communication and contribute significantly to individuals' holistic development, particularly in educational and professional spheres. Strong foundational handwriting skills are indispensable for success in various aspects of life, and these findings highlight the urgency of implementing these targeted interventions to bridge the existing gap (States et al., 2018). According to Chourasiya (2019), children should be able to hold a pencil with three fingers by the time they are 4 to 5 years old; this provides perfect isolated finger control for accurate and refined pencil control. Children should demonstrate a fundamental level of the legibility of their handwriting. Results indicate that pupils at the Daycare Center did not meet the standards for age-appropriate development.

This remarkable improvement suggests that the hands-on, participant-centered approach of team teaching had a positive and measurable impact on the children's basic handwriting skills, with team teaching, educators with varying backgrounds and expertise can contribute their unique insights to the learning process. Moreover, team teaching requires educators to collaborate closely in planning lessons and activities. This collaborative approach ensures that hands-on experiences are aligned with learning objectives, instructional strategies,

and assessment methods. It also allows for the seamless integration of hands-on activities with other aspects of the curriculum (Inan & Inan, 2015). The improvements in accuracy, control stroke levels, consistency, gripping skills, independence, and neatness indicate that the intervention positively and substantially impacted pupils' ability to write legibly and proficiently. The enhanced handwriting proficiency will likely benefit pupils in academic and professional contexts where clear and readable writing is essential.

The results highlight the effectiveness of the hands-on participant-team teaching approach in enhancing children's basic handwriting skills. The study of Schwichow et al. (2016) generally stated that students who engaged in hands-on activities surpassed their counterparts who utilized traditional paper-and-pencil methods on a hands-on assessment identical to the training tasks. The significant improvement observed in this study suggests that this teaching method could be a valuable tool for educators and schools aiming to bolster pupils' foundational writing abilities. Lester and Evans (2009) reported that learner interactions were improved by using a team-teaching strategy. It also underscores the importance of innovative and interactive teaching strategies in achieving educational goals. It also agreed with Kloo and Zigmund (2008), who stated that team teaching provided more chances for learners to respond and interact. According to Hong et al. (2020), enhancing handwriting skills in early childhood pupils is imperative as it fosters the development of foundational abilities crucial for academic success. Mastering handwriting at a young age nurtures fine motor skills, enabling children to manipulate writing tools with precision and control (Hong et al., 2020). This skill development contributes to cognitive growth, as the physical act of writing engages various areas of the brain involved in language processing and memory. Moreover, proficiency in handwriting enhances communication by providing children with a means to express themselves clearly and effectively. Strong handwriting skills are also correlated with improved academic achievement across multiple subjects, as legible handwriting promotes comprehension, organization, and retention of information (Schwichow et al., 2016). Additionally, mastering handwriting fosters independence and confidence in children, empowering them to work autonomously and express their unique ideas and personalities through written communication. Thus, prioritizing the enhancement of handwriting skills in early childhood lays a solid foundation for future learning and success.



## 5. Conclusion

The research highlights the diverse progress and challenges observed in students' handwriting skills, showcasing a complex developmental process. While some students demonstrate exceptional accuracy and control, others show improvement with ongoing struggles in consistent precision. Determination among students making gains despite obstacles underscores the importance of persistence in overcoming difficulties related to stroke formation and grip management. Structured interventions and personalized assistance play a pivotal role in advancing skills, emphasizing the impact of tailored support. However, challenges persist in achieving complete precision, indicating the need for targeted interventions addressing specific hurdles in motor control for precise handwriting. These insights emphasize the significance of persistence, customized support, and structured interventions in fostering handwriting skills, offering valuable implications for educators and practitioners to design effective teaching strategies. The research underscores the effectiveness of the HPTT approach in enhancing basic handwriting skills, but further exploration is needed regarding its long-term effects and applicability to diverse pupil populations and settings.

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