



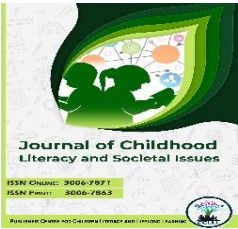
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The Impact of Teacher Intervention on Early Writing Development in Kindergarten 1 Students

Dr. Kiran Kanwal¹

Correspondence: kirankanwal@gmail.com		DOI https://doi.org/10.71085/joclsi.03.01.48
Affiliations ¹Independent Researcher  https://orcid.org/0000-0001-8208-8867	Abstract This research looks at how teachers use purposeful interventions, with specific consideration for parent engagement, planned errors, sensory activities and scaffolding practices to help kids (3.5–4 years old) develop early writing competencies. A quasi-experimental research method separated 26 students into two study groups to conduct the investigation. The intervention group experienced structured support because their teachers demonstrated letter formations and employed error correction methods while guiding selected fine motor activities and using kinesthetic methods. It showed better fine motor performance as well as improved letter writing abilities and enhanced writing quality than students in the control group. The techniques led educational students to develop better pincer grip skills together with improved written proportions and improved entire letter formation structure. Students' skill acquisition speeded up as well as their motivation because of the combined approach of multisensory learning with parent involvement and both groups showed improved application of learned skills during autonomous play sessions. Data confirms that students need purpose-driven training methods combined with interactive activities along with scaffolding support systems in order to build their writing competencies along with self-assurance and base skills. Future educational research requirements must examine the long-term effects of these approaches in different educational contexts. Keywords: Early Intervention, Writing Development, Fine Motor Skills, hand-eye Coordination, Letter Formation	
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Introduction

Early writing development is a critical component of a child's academic success, and teachers play a pivotal role in fostering this crucial skill. Kindergarten students, particularly those in the first year, are at a crucial stage where they learn the foundational skills of letter formation, phonological awareness, and the mechanics of writing. (Clark & Luze, 2014) (Cunningham et al., 2009). Effective teacher intervention plays a pivotal role in shaping students' writing development, with far-reaching implications for their long-term academic achievement. By providing targeted support and scaffolding, teachers can bridge gaps in learning, helping students build foundational skills that enhance both competence and confidence. This intervention not only addresses immediate challenges but also cultivates a sense of agency in students, empowering them to take ownership of their learning process. Students who are supported and led to believe in their own capabilities build on their self-confidence, which in turn generates intrinsic motivation to go after the new or more complicated concepts. And there's a positive feedback loop to this cyclical relationship: confidence feeds motivation, and motivation inspires learning—shoring up the student's academic resilience and adaptability. As a result, intentional, responsive and student centered teacher interventions are more than their skill provision of writing, they enable lifelong learning and success.

The work of preschool and kindergarten teachers is a foundationally important endeavor in the nurturing of young learners' foundational literacy skills. Beginning early to educate the children in their initial steps of education, these educators are the guides to arrive on the structured support and the needed targeted instructions to build up the reading and writing competencies. Early literacy skills are robust predictors of later academic achievement; therefore, early interventions are emphasized. Decoding and word recognition that

are the sources of later reading on the other hand, need people to be able to recognize and recall the alphabet names and sounds, something that forms the basis of phonological awareness (Cunningham et al., 2009).

In addition, writing (or even just writing one's name) has been found to not only support letter knowledge but also fine motor coordination in developing literacy (Clark & Luze, 2014). Handwriting performance is a complex combination of cognitive and physical processes with visual processing and fine motor skills as critical components. According to Cameron et al. 2012, the coordination of hand movements, precision in sustained grip, and spatial awareness are pre requisites for legible handwriting and are also markers for generalized development.

Literature Review

The Importance of Early Intervention in Writing Development

As it stands, existing research demonstrates the need for intervention with regards to developing writing skills at the early stages. Difficulties with writing in kindergarten and early elementary grades are associated with reading comprehension, academic achievement and even, social emotional wellbeing. Therefore, for example children who are failing in writing can find it difficult to finish assignments, take notes or express what they know, resulting in frustration, loss of motivation and low self-esteem (Vacalares et al., 2023).

Role of Fine Motor Skill Development in Writing Readiness

Early writing development requires fine motor skills and hand eye control so that children can compete the writing tool and produce legible letters. The skills are the basis for learning writing mechanics, like grip, stroke formation, spatial organization. Through things such as tracing, coloring in the lines, cutting out shapes, or pasting stickers, research shows that being able to have

dexterity and coordination is vital in being able to write well (Cameron et al., 2012). Structured exercises not only work to enhance your physical capabilities but also work to enhance the 'physical' fundamentals of writing.

Early support is most critical to getting around writing challenges, and other studies underline the long term impact. According to Fox (1996), strategies tailored for struggling writers are encouraged because they are in different situations than that of struggling readers. Glazer (1991) shares the issue that emotional regulation can interfere in performance during writing tasks for children with learning difficulties.

By offering kids opportunities to find enjoyment in hands on, interactive exercises like lacing beads, and making patterns with counters or molding playdough, writing readiness is boosted through the integration of motor skills and creativity. These are activities that help children relate the physical movements to forming letters, thus strengthening motor skills and early literacy knowledge at the same time. For instance, playing with playdough, forming letters can teach letter shapes, and strengthen hand muscles. Such multisensory approaches are not only useful for promoting skill development, but also maintaining children's interest and interest, which leads to children's sustained engagement and better learning outcomes.

Role of Early Teacher Interventions

Early interventions involving fine motor skills and writing readiness are an important team effort of teachers. The need to address developmental needs while promoting creativity and autonomy led to the development of activities that were designed to be structured, but engaging. For example, tools such as sand trays, textured writing boards, and clay for letter molding, are some tools children may use to work on fundamental skills in a manner that's fun.

Early writing development is also further bolstered by creating a positive and low pressure classroom environment. Encouraging

perseverance through guided practice and offering consistent reinforcement of correct grip, posture, and stroke order prevent inefficient habits from forming. Early interventions that integrate physical, cognitive, and emotional support allow children to approach writing tasks with confidence, laying the groundwork for long-term academic success and instilling a lifelong appreciation for learning.

Parental Involvement as a Pillar of Early Intervention

Parental involvement is a critical element of early childhood education, significantly influencing academic and social outcomes (Epstein, 2018; Fan & Chen, 2001). By engaging parents in the learning process, teachers can ensure the reinforcement of writing skills beyond the classroom. Say for example, parents were involved with helping children with guided writing at home, which would provide learned consistent reinforcement. In addition to facilitating the acquisition of skill, this collaboration empowers parents to be a part of the whole child's educational journey by engaging them directly in the early intervention process of their child.

Innovative Teaching Strategies in Writing Instruction

Targeted teaching strategies in addition to effective teaching strategies can further amplify writer readiness by addressing common challenges. Writing errors are modeled deliberately within the instruction in order to encourage students to critically examine their own work and learn to correct their own work, supporting a cognitive theory that active reflection and metacognitive growth is essential (Vygotsky, 1978).

Among such, we include kinesthetic strategies like tracing letters in sand or using playdough to form letters which involve multisensory learning experiences for increasing memory retention and fine motor skills. The methods, as such, rely on the research work explaining that the multi-

modal engagement will lead to better learning outcomes (Sousa, 2016; Case-Smith et al., 2012). These techniques can be integrated in the early writing instruction so as to provide an inclusive & dynamic learning, which will meet the diverse developmental needs.

Addressing Writing Challenges Through Early Intervention

Early intervention is needed to address writing challenges that limit academic and social development according to the literature. If writing difficulties are not taken care of, they may lead to long term struggles and emotional setbacks (Vacalares et al., 2023; Glazer, 1991). Incorporating fine motor skills into the strategies is important to practice such as tracing and play dough manipulation; yes, it does build the physical dexterity but it also develops creativity which combined with the engagement found in these strategies is essential for continuous learning.

Research Question

This research examines the influence of teacher intervention (e.g. scaffolding, modeling, direct instruction, parental involvement, etc.) on KG1 students' early writing development.

Hypothesis

Intentional teacher intervention (modeling, targeted fine motor skill development, deliberate errors, parental involvement, scaffolding) will improve Kindergarten student writing performance and automaticity well beyond students who do not receive such intervention.

Methodology

The present study used a quasi-experimental design to determine the effects of targeted teacher interventions on early writing development. Two groups of Kindergarten students, aged 3.5–4 years, were selected from the same class to ensure comparability:

- **Intervention Group:** Consisted of 14 students who received structured teacher-led interventions.
- **Control Group:** Consisted of 12 students who participated in standard classroom writing activities.

The study spanned 12 weeks, with assessments conducted at three time points: baseline, midpoint (6 weeks), and final (12 weeks).

Intervention Components

Eliciting Prior Knowledge (Scaffolding)

The teacher's eliciting prior knowledge was dynamic and engaging to elicit the children's prior knowledge of basic geometric concepts as they exist. She began by starting with the children to recall what sort of lines they had known before, like 'sleepy lines', 'standing lines', 'curvy lines', and 'wavy lines'. The questioning questions proved to be a successful technique in creating the link between abstract concepts on one hand and it (concrete experience) on the other, taking into account the children's earlier knowledge in gaining their participation. The kinesthetic approach where the teacher suggested that the children actually physically create the lines aided in deepening their understanding. All of this was done to make a line clear to the children. For example, to show a 'standing line,' the children had to stand in an upright position with hands raised above their heads; and for a 'sleepy line,' the children had to lie down to represent the horizontal line. The children also involved fluid lines, like 'curvy' or 'wavy', in their structure by using their bodies to move in the very same way as it would in nature. In doing this they had a kinesthetic engagement with the abstract concept of lines and delivery of the connection between their bodily movement and visual representation. Following this movement activity, I pointed out to the teacher of different lines, teaching them how to draw each kind of line. Then the children were allowed to do their own lines practicing what they had learned by Visual and at the same time Physical Experience.

Targeted Fine Motor Skill Development

Throughout the 12-week intervention, the teacher developed a well-rounded and comprehensive method to strengthen the children's fine motor skills through activities that fed the skill building and the wants for engagement. Then the teacher's strategy, included several activities to enhance hand eye coordination, dexterity and overall fine motor control that act as foundation stones for early writing skills.

Cutting and Coloring

Cutting with scissors, one of the key activities, not only improved hand eye coordination, but also facilitated children's fine motor activity demands which take precision and control. Another exercise that was targeted was to color out certain worksheets because it allows students to maintain within boundaries and control their pencil grip, and also it develops their creativity. Besides these, hand strength and finger dexterity was developed while activities like lacing beads and pasting stickers onto cardboard were also included. In addition to being fun, these exercises helped children have finer control of the way they moved their hands and arms, and became more skilled at picking up and manipulating smaller objects.

Peeling and Puzzles

Peeling stickers was an innovative activity that combined motor skills and routine tasks. As part of the routine cleanup, the children were instructed to peel stickers off the toys and put the peels in a bowl, and then throw that away. In this task, development of fine motor skills met with real-life applications, and children became more focused on their actions, as they learned coordination and responsibility with this task. In addition to reading skills, the puzzles were also a chance for fine motor practice, requiring children to use their hands to move around and fit together tiny puzzle pieces and thus contribute to their hand-eye coordination.

Playdough and Letter Stamps

Beyond these individual tasks, the teacher also planned adult led activities to specifically aid fine motor skills. For example, the children played with rolling playdough into balls and making it into different shapes helped with hand strength, but also encouraged creativity and sensory exploration. Letter stampers were added in for another dimension to the activities – children used the stampers to press letters into playdough, a great combination of fine motor work and early literacy skills. This was enabling them to form a link between physical activity and letter formation, bonding the way in which hands move and the way in which you write.

Choices in Writing Tools

Additionally, the teacher had a focus on encouraging autonomy and self-confidence through providing children the options of choosing what writing tools they want to use. During the months, she allowed children to choose which tools they used—pens, pencils and crayons as well as paintbrushes—so that they would feel a sense of ownership in their learning process. By practicing this, the children developed fine motor skills as well as were given power, helping them to feel independent and confident with using any writing instrument.

Explicit Instruction on Letter Formation through Direct Instruction and Multisensory Approaches

In early childhood education, letter formation is one of the pivotal teaching aspects to the development of children's writing. Teaching children to write letters is arguably as important as teaching them to read letter sounds. Direct instruction is central to ensuring children learn to write letters accurately, consistently and without effort. This approach often emphasizes three core aspects: correct stroke order, appropriate spacing, and proper posture. It's the elements that help us create legibility OR fluidity in handwriting. It has been shown through research that children's handwriting skills greatly improved when there is

explicit instruction on the order in which strokes should be made (Graham, 2018). When teachers emphasize these specific elements, they help students build a strong foundation of motor skills that will benefit them throughout their academic journey.

Child-friendly cues

Multisensory techniques used in this instruction make learning very enjoyable. Although, studies show that while some children retain better with just one visual or auditory element, combining all three (visual, auditory, kinesthetic) will engage and retain children better (Montessori, 1967). Child friendly auditory cues were put together with the visual demonstrations in the learning of letter formation in this particular teaching environment. As an example, the teacher introduced the letter 'O' by saying make a 'cuh,' go round and round, and stop. Similarly, for the letter 'a,' the teacher guided children through the process: "It's a 'cuh,' go up, come down, loop. Besides helping children remember the starting point of the letter, the use of the word 'cuh' adds to the process a rhythmic, auditory element. The significance of this rhythm is that it bonds together the kinesthetic task of writing with the cognitive task of repetition of stroke order. Repetitive and rhythmic learning has been found to help children's motor memory so that they can write more flowingly and automatically (Cunningham & Stanovich, 2001).

The teacher made up the visual and auditory cues of 'make a sleepy line, go up, and around' for the letter 'e.' This metaphorical 'sleepy line' made the concept a relatable and engaging one, so children can connect those abstract letter shapes with ideas that they are familiar with and consequently makes the learning process simpler and easier.

The teacher's strategy for teaching the letter "g" exemplified this approach further with the cue: "Cuh, go up, come down, and down, cat's curly tail." In this cue a sequence of movements and imagery were combined to help guide children in navigating the complicated shape of the letter g. The inclusion of a visual image (the cat's curly

tail) will also make the stroke in the letter easier for kids to visualize and therefore more fun and less intimidating (Lester & Mombourquette, 2020).

The teacher integrated these child – friendly auditory cues with visual demonstrations using a multisensory approach – using multiple senses and also supporting different learning styles.

Deliberate Error for Visual Aid

Children ages 3.5 to four are in the Piagetian preoperational stage of cognitive development, in which their ability to visually decompose letters and discriminate correct from incorrect letter representations is developing. For this age group, they are very much dependent on perceptual cues rather than logical reasoning — in other words, distinguishing between a letter written correctly and a letter written incorrectly can be a challenge. To remedy this lack, the teacher used a dual modeling technique—we showed incorrect and correct letter orientations side by side. By encouraging children to participate in active acts of comparison and judgment, this approach promoted both cognitive and perceptual development.

The teacher deliberately modeled common errors, including letter reversals, wrong stroke sequences, spacing and orientation problems in order to help the task remain engaging and comprehensible. The correct version was juxtaposed with each error, in clear visual contrast, and that combined with the previous visualization allowed for learning. For instance, writing a reversed 'b' next to properly oriented 'b' enabled the children to see the difference in a direct comparison. Error based learning maximizes on learning principles that encourage error and correction so as to improve problem solving and cognitive flexibility, and this method fit well in these principles.

Moreover, the teacher added multisensory stimuli to enhance their grasp of things under study and effortlessly keep their attention. An element of auditory feedback was added through

auditory cues, like "beeping" for an incorrect letter and a "tick" for a correct one, that complemented visual input. Both playing the game and crossing out incorrect letters and adding a checkmark for correct ones used kinesthetic learning because children could literally see and replicate these checking actions. With this multisensory strategy we could be certain that the instruction would be accessible to students with a variety of learning modalities (visual, auditory, kinesthetic) and learning preferences and strengths.

Parental Involvement

As the parents are the primary caregivers in the life of a child, they contribute to the holistic development of a child to a great extent. They are involved in all of the work, from school readiness, to social skills, to responsible decision making. In addition to caregiving, a parent fulfills several other roles as the child develops emotionally, cognitively, and socially, and fits the child to lifelong learning and wellbeing. Epstein (2018) repeatedly shows that children with supportive and engaged parents do better academically, have better interpersonal skills, and report higher self-esteem again pointing to the transformative power of parental involvement during key years.

As a part of a parental intervention program, parental involvement in the reinforcement of writing skills outside the classroom was strategically inserted. To help standardize and simplify writing instruction at home, I sent weekly emails to parents with resources such as letter formation guides, tracing templates, and child friendly cues. The deliberate error technique, which models both incorrect and correct letter formation, was shared with parents to encourage their role in guiding their child's critical thinking and error detection during practice.

Furthermore, parents were encouraged to dedicate at least 15 minutes daily to writing activities with their children, reinforcing classroom skills and demonstrating the

importance of consistent practice. This regular engagement not only enhanced skill retention but also highlighted the value of ongoing parental involvement in learning.

Data Collection and Analysis

Assessment Criteria

Students' writing samples were evaluated based on the following criteria:

1. Pincer Grip: Assessment of fine motor control and utensil handling.
2. Letter Formation: Evaluation of shape, size, and proportionality of letters.
3. Directionality and Spacing: Assessment of correct stroke order, line alignment, and spacing between letters.

Baseline Assessment

The study began with a pre-test to evaluate the initial pre-writing skills of both groups. Students were assessed on their ability to write letters simply by looking at them. The assessment also included observing the children's tripod grasp and their ability to follow instructions. Key observations included:

- The accuracy and consistency of strokes.
- The intensity of the crayon's impression on the paper, which indicated fine motor control.

This initial assessment provided a baseline to compare progress throughout the study.

Midpoint Assessment

After six weeks, a second assessment was conducted to evaluate the progress made by both groups. Students in the intervention group showed notable improvements in the following areas:

- Fine Motor Skills: Enhanced pincer grip, better control of writing utensils, and improved ability to stay within boundaries while drawing or writing.

- Letter Formation: Increased consistency in the shape, proportion, and spacing of letters.
- Writing Legibility and Organization: Better alignment and attention to detail in their writing.

The data highlighted the effectiveness of the intervention strategies, with the control group showing comparatively minimal progress.

Final Assessment

At the end of the 12-week study, students were assessed again to measure their overall development. The analysis revealed statistically significant differences between the intervention and control groups:

- The intervention group outperformed the control group across all assessed criteria, including fine motor skills, letter formation, and writing quality.
- Students who participated in the intervention demonstrated a higher level of writing readiness and confidence.

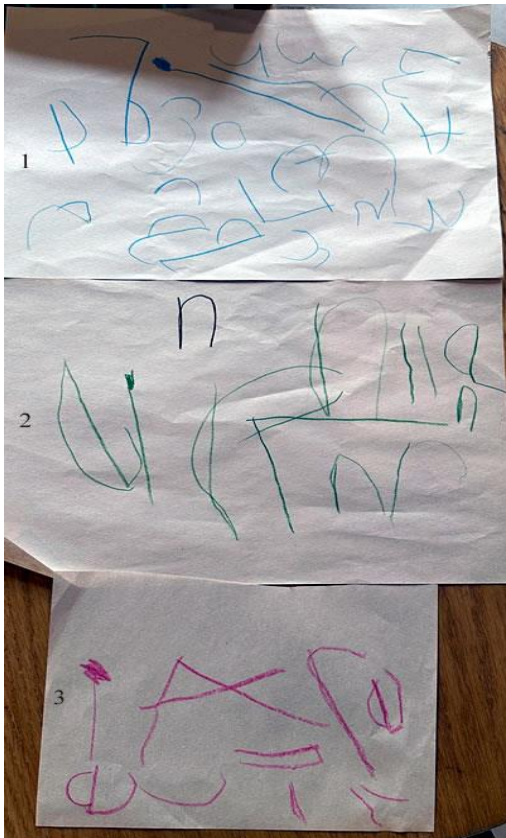


Fig 1. A sample from the control group. Top image is baseline assessment, middle image is mid-week assessment and bottom image is final assessment

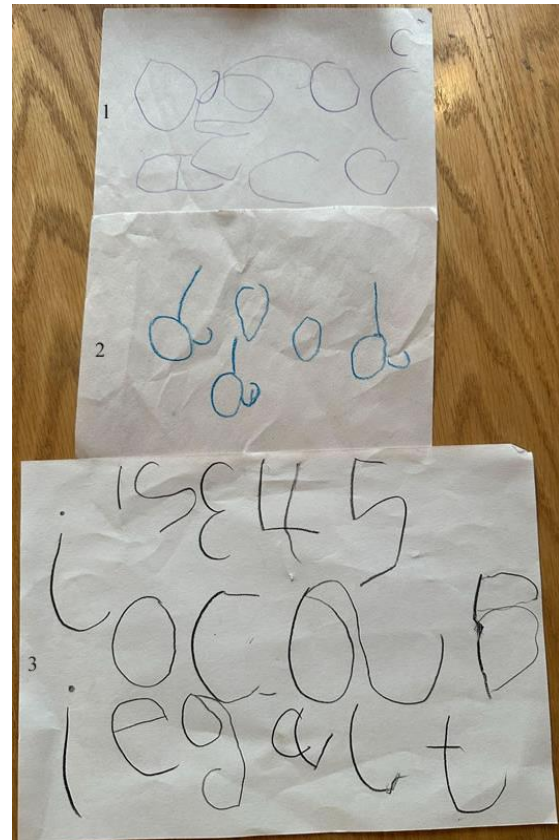


Fig 2. A sample from the test group. Top image is baseline assessment, middle image is mid-week assessment and bottom image is final assessment

Behavioral Observations

Transformative Impact of Learning Beyond the Classroom

Observations during free play revealed the broader impact of the intervention. Students in the intervention group were observed mimicking the teacher's "beeping" technique for error correction, indicating the internalization of error-detection skills, as described in Bandura's (1986) social learning theory. These results were indicative of the transfer of learned skills to independent activities, thereby reiterating the benefits of modeling and multisensory techniques.

The intervention thereby catalysed a transformative learning dynamic of structured writing activities in the classroom engaging students' intrinsic motivation for writing beyond the classroom setting. Spontaneous engagement of children using free play, e.g., children voluntarily writing on boards, or copying text from the environment, represented a powerful cognitive and emotional shift. These writing behaviours were voluntary and became something that were once an intimidating task became an enjoyable self-directed exploration. The organic transfer of knowledge between learners demonstrates the ability of well-designed pedagogical strategies to encourage intrinsic motivation and deep engagement.

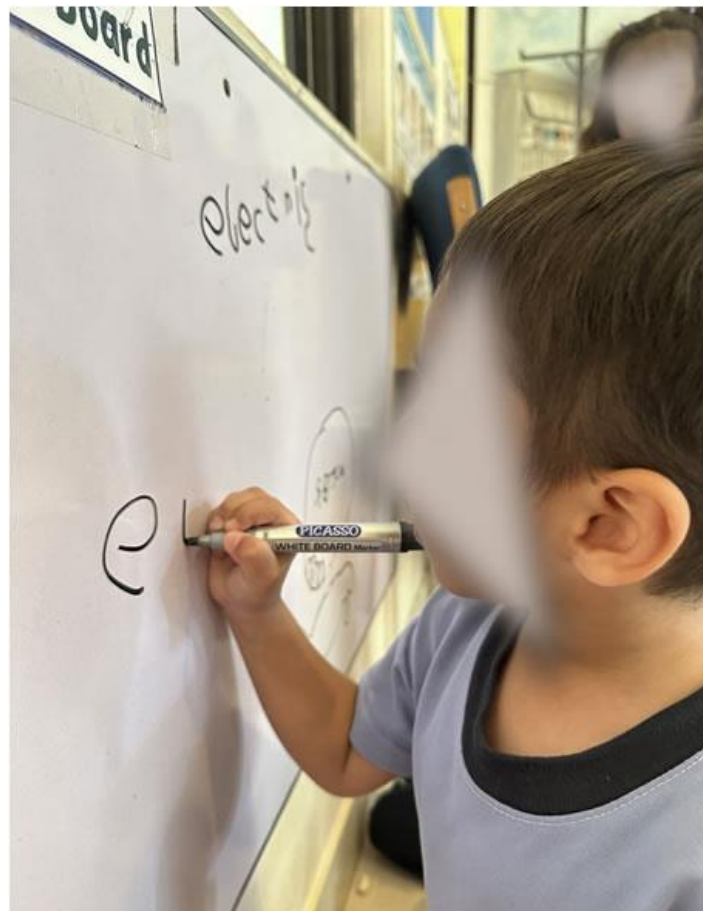


Fig 3. *A Child Reproducing Text Modeled by the Teacher in Circle time During Free Play***Progress Tracking**

During the study, the teacher followed progress in fine motor skills and hand eye coordination systematically. Structured activities and scaffolding were applied in the form of allowing gradual skill development, which has evidence to back up that fine motor development predicts achievement (Grissmer et al., 2010).

Results and Discussion**Engaging Multisensory Approaches to Strengthen Conceptual Understanding**

Multisensory strategies of eliciting prior knowledge enhanced the children's understanding of basic geometric lines, including "sleepy lines," "standing lines," "curvy lines", and "wavy lines." For the children, kinesthetic activities, in which they embodied lines through movement and postures, served to embody abstract concepts and physical representations. This active participation reinforced memory and enhanced enthusiasm, because each one of these children accurately mimicked the line types presented to them. Their ability to translate physical experiences into visual representations was further demonstrated in their transition to drawing these lines on paper.

Enhanced Fine Motor Skills and Writing Confidence through Targeted Interventions

Significant improvements in the children's fine motor skills, confidence and enjoyment of writing activities resulted from the comprehensive 12-week intervention. Cutting with scissors, coloring within lines, threading beads, and pasting stickers developed hand-eye coordination, precision and dexterity for the efficient pen on paper.

Playdough and letter stamping strengthened hands, combined motor skills with early literacy, and granting children freedom of choice when choosing writing tools like crayons, pencils, and paintbrushes gave them control and increased their confidence. Sticker peeling and puzzle assembly were multisensory and engaging tasks that made writing something children looked forward to, and which delivered a positive association to learning along with a motivator to continue to practice on a regular basis. At the end of the intervention, the children showed better control over writing tools, more confidence of writing and were more enthusiastic to write.

Enhanced Letter Formation Skills through Multisensory and Error-Based Learning Approaches

The children were able to recall and reproduce letters more accurately due to the direct instruction from the teacher supported by child friendly auditory cues and visual demonstrations. Complex shapes were expressed using phrases such as 'Make a 'cuh,' go round and round, and stop' or metaphors such as 'a cat's curly tail' to prompt children to remember letter formation movements. The multisensory approach did wonderful things that helped motor memory and made learning more enjoyable because it was relatable.

The deliberate error technique also assisted children in differentiating correct and incorrect letter formation. Presenting letter reversals, or incorrect stroke sequences, alongside correct examples invited children to analyse and compare, thus encouraging self-correction. Additionally, to improve understanding and maintain high levels of engagement, auditory and kinesthetic stimuli

were included; e.g., "beeping" sound for incorrect letters, and "tick" sounds for correct ones.

Parental Engagement and Outcomes

With parental involvement, having children practice writing at home, accelerated their progress, and increased their self-confidence. In addition to reinforcing teacher classroom learning, this engagement encouraged a sense of pride among learners especially, children were eager to share their work with teachers and peers and fostered deeper engagement and a collaborative learning environment.

Then there was continuous communication between parents and teachers, where this knowledge enabled a relationship of trust and mutual respect. By being actively involved in their child's development parents were encouraged to collaborate. It was also a very transparent exchange of information which enabled parents to take the initiative and start reaching out for guidance on how to best support their child's learning at home.

By creating a partnership for this intervention, this was brought out of the classroom and was showing how the involvement of parents can connect the home with school and increase the impact of school practices.

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