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Improving Grade 1 Pupils' Fine Motor Skills Through the Imagination Tree

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ABSTRACT

Fine motor competence supports children's participation in early writing and other classroom tasks, yet some beginning pupils experience difficulty with the coordinated hand and finger movements required for writing, coloring, cutting, and manipulating learning materials. This classroom action research examined the use of the Imagination Tree, a brief play-based routine using locally available manipulative materials, to support the writing-related fine motor performance of Grade 1 Santan pupils at Basco Central School, Batanes, Philippines. The study used a one-group pretest–posttest design complemented by structured teacher observations. Eleven pupils (eight boys and three girls) participated during school year 2019–2020. Before regular lessons, pupils completed 5- to 10-minute activities involving sorting, picking, filling, modeling playdough, manipulating local seeds, sensory writing in fine sand, and threading paper beads. Writing portfolios were scored with a rubric reported as having been validated by the Schools Division Office. The mean score increased from 39.55 (SD = 14.69) at pretest to 85.45 (SD = 14.21) at posttest, an absolute mean gain of 45.90 points. The study recorded a significant paired comparison, $t(10) = -15.30$, $p = .005$. Teacher observations further indicated active participation, sustained interest, readiness to work within time limits, and excitement during hands-on activities. The findings suggest that a short, low-cost, classroom-embedded manipulative routine may be a useful support for writing performance. However, the small single-class sample, absence of a comparison group, reliance on a writing rubric as a proxy for fine motor skill, and unavailable pupil-level data limit causal and statistical interpretation. Replication using a standardized fine motor measure, documented fidelity, and a comparison condition is recommended.

1. Introduction

The transition into formal schooling places substantial motor and cognitive demands on young learners. In Grade 1, children are expected to form letters, produce written work within classroom time, color within boundaries, cut materials, handle books and tools, and manipulate small learning objects. These tasks rely on controlled movements of the hands and fingers, visual–motor integration, bilateral coordination, grip stability, attention, and the capacity to sequence actions. When these foundations are still developing, pupils may understand a lesson but struggle to show what they know through written or manipulative work.

Fine motor skills are therefore relevant not only to physical performance but also to school participation. Longitudinal evidence has shown that fine motor indicators measured near school entry predict later achievement even after accounting for several background characteristics (Grissmer et al., 2010). Cameron et al. (2016) explained that motor tasks can draw simultaneously on coordination, executive function, and visuospatial processing. This helps clarify why early writing is demanding: a child must control the writing tool while remembering the intended form, monitoring position on the page, sustaining attention, and correcting movement in real time.

Handwriting remains especially important in the primary grades. Fine motor control is associated with handwriting legibility among young children (Seo, 2018), and systematic evidence indicates that well-designed handwriting instruction can improve legibility and fluency (Santangelo & Graham, 2016). These findings do not imply that all motor play automatically transfers to better handwriting. Rather, they support the value of deliberate, repeated, and developmentally appropriate experiences that strengthen component skills while connecting them to authentic writing tasks.

School-based interventions are most useful when they are feasible in ordinary classrooms. Taverna et al. (2020), for example, reported gains in visual–motor integration following a 10-week program for kindergarten and first-grade pupils, although changes varied according to pupils' initial motor status and the specific outcome assessed. A group-based sensorimotor intervention among primary pupils also produced improvements in handwriting-process and related sensorimotor measures, with the distribution of practice appearing consequential (Li-Tsang et al., 2023). Together, this literature favors structured practice, appropriate task progression, and sufficient time for learning rather than isolated drills.

1.1 Local Context and Rationale

At Basco Central School, teachers observed that several Grade 1 pupils aged approximately five to six years could engage intellectually with lessons but had difficulty completing manipulative activities such as writing, coloring, and cutting. The concern was particularly evident in Grade 1 Santan during school year 2019–2020. The classroom problem was practical: pupils needed a routine that could be delivered before lessons, use inexpensive materials, and build the hand control and coordination needed for written work.

The researcher introduced the Imagination Tree as a classroom-based response. In the study, the term referred to imaginative or creative play in which pupils performed short manipulative tasks using familiar, locally available materials. Activities included counting and patterning with clay and local seeds identified in the study as agagay and vutalaw, using a count-and-sort posting box, practicing sensory writing in fine sand, threading paper beads, and manipulating homemade playdough through rolling, squeezing, twisting, and building. Sorting, picking, and filling activities were also incorporated.

The intervention was designed to provide repeated opportunities for concentration, hand–eye coordination, pincer grasp, hand strength, dexterity, and efficient movement. Its play-based character was also intended to sustain interest. Competition and games were occasionally integrated, while a short time limit encouraged pupils to complete tasks with alertness and focus. Because the materials were simple and locally obtainable, the routine had potential for continued use without specialized equipment.

1.2 Conceptual Basis of the Intervention

The Imagination Tree can be understood as a task-oriented sensorimotor routine. Each activity requires the learner to perceive an object or target, plan a movement, execute the movement with the hand and fingers, and use sensory feedback to adjust performance. Repetition provides opportunities to refine movement patterns, while variation across sorting, threading, molding, and writing tasks broadens practice. The intervention also embeds the activity in a meaningful classroom context rather than treating motor development as a separate clinical exercise.

A second feature is the use of distributed practice. The study indicates that the tasks were conducted consistently from October 2019 to January 2020, generally for 5 to 10 minutes before the lesson. Short, repeated sessions may reduce fatigue and permit pupils to consolidate emerging skills across time. This pattern aligns with evidence that intervention scheduling and opportunities for practice can shape handwriting-related outcomes (Li-Tsang et al., 2023).

A third feature is engagement. Young pupils are more likely to persist when activities are concrete, varied, and playful. The use of seeds, sand, paper beads, posting boxes, and playdough creates tactile and visual interest. Engagement does not itself prove learning, but it can increase time on task and the number of successful practice attempts. In the present action research, teacher observations were therefore used alongside quantitative scores to describe how pupils responded during implementation.

1.3 Purpose and Research Questions

This study aimed to examine whether the Imagination Tree intervention was associated with improved writing-related fine motor performance among Grade 1 Santan pupils of Basco Central School during school year 2019–2020.

Specifically, it addressed three questions: (1) What were the pupils' mean writing-performance scores before and after implementation? (2) Was there a statistically significant difference between the pretest and posttest scores? and (3) What implementation insights were recorded by the teacher?

2. Methods

2.1 Research Design

The study was a classroom action research project using a one-group pretest–posttest design. The study described the approach as descriptive-comparative and used a paired-samples t test. For methodological clarity, the design is characterized here as pre-experimental because all participants received the intervention and no untreated or alternative-treatment comparison group was documented. Quantitative pretest and posttest scores were complemented by the implementing teacher's recorded observations of pupil participation and response.

This design was appropriate for an initial classroom inquiry intended to address an immediate teaching problem and examine whether performance changed over the implementation period. It cannot, however, isolate the intervention from maturation, regular instruction, repeated testing, or other experiences occurring during the same period. The results are therefore interpreted as evidence of within-class improvement associated with the intervention, not as definitive proof of causation.

2.2 Setting and Participants

The study was conducted in Grade 1 Santan at Basco Central School, Schools Division of Batanes, Department of Education, Region II – Cagayan Valley, Philippines. The study identified the implementation period as September 2, 2019 to February 28, 2020, with regular Imagination Tree activities recorded from October 2019 through January 2020.

Participants were 11 Grade 1 pupils: eight boys and three girls. The study stated that the class was purposively selected because the classroom concern involved pupils who had difficulty with writing and related manipulative tasks. The analysis used the intact participating class.

2.3 The Imagination Tree Intervention

The intervention consisted of short manipulative activities delivered before the regular lesson. Sessions generally lasted 5 to 10 minutes. The routine included the following task families, which were selected to exercise hand and finger control through varied tactile materials:

Task family	Examples documented	Targeted classroom function
Precision grasp and release	Picking, sorting, filling, and placing objects in a count-and-sort posting box	Pincer grasp, controlled release, visual attention, and hand–eye coordination
Molding and resistance	Rolling, squeezing, twisting, and building with homemade playdough or clay	Hand strength, finger isolation, dexterity, and bilateral use
Patterning and counting	Manipulating clay and local agagay and vutalaw seeds	Precision, sequencing, sustained attention, and coordinated placement

Task family	Examples documented	Targeted classroom function
Prewriting and sensory tracing	Writing or tracing in fine sand	Stroke direction, visual–motor planning, and low-pressure letter practice
Threading	Paper-bead threading	Bilateral coordination, visual tracking, graded grasp, and persistence
Motivational supports	Games, peer competition, and task completion within a brief time limit	Engagement, alertness, pace, and repeated practice

2.4 Instruments and Data Sources

Writing performance was assessed using pupils' written-work portfolios and a scoring rubric. The study stated that the rubric was prepared to compute portfolio scores and was validated by the Schools Division Office before the evaluation. The study did not reproduce the rubric, its score range, domains, inter-rater procedures, or validation evidence. Consequently, the numerical scores are presented as writing-performance scores and not as results from a standardized clinical measure of fine motor ability.

Implementation insights were drawn from the teacher's recorded observations after activities. The study identified active participation, response to time limits, repeated manipulation, interest, excitement, and positive reactions. No interview protocol, observation checklist, verbatim pupil statements, or independent observer records were included. These data were therefore synthesized descriptively rather than treated as a full qualitative study.

2.5 Procedure

The study formally ran from September 2, 2019 through February 28, 2020. A pretest was administered on October 10, 2019. From October 2019 through January 2020, pupils completed the Imagination Tree tasks consistently before regular lessons. The teacher integrated games where appropriate, set an expected completion period of 5 to 10 minutes, and recorded pupil outputs and observations after activities. The posttest was administered on February 14, 2020.

The sequence was embedded in normal classroom routines. Manipulative activities preceded the lesson, after which pupils completed their regular written work. The study stated that monthly records showed progressive improvement in the pupils' ability to complete written work within the allotted time and follow correct writing strokes. Only aggregate pretest and posttest statistics were available in the attachment supplied for manuscript development.

2.6 Data Analysis

Pretest and posttest performance was summarized using the number of learners, mean, and standard deviation. The absolute mean gain was calculated as the posttest mean minus the pretest mean. The study presented a paired-samples t test with 10 degrees of freedom and an alpha level of .05. The t statistic and p value are reproduced as stated because pupil-level paired scores were not available for independent recomputation.

Teacher observations were organized into recurring implementation themes. The synthesis retained only ideas explicitly documented in the study and did not invent quotations or attribute statements to individual pupils. Because the observations were produced by the implementing teacher, they are interpreted as reflective implementation evidence rather than independent qualitative confirmation.

3. Results

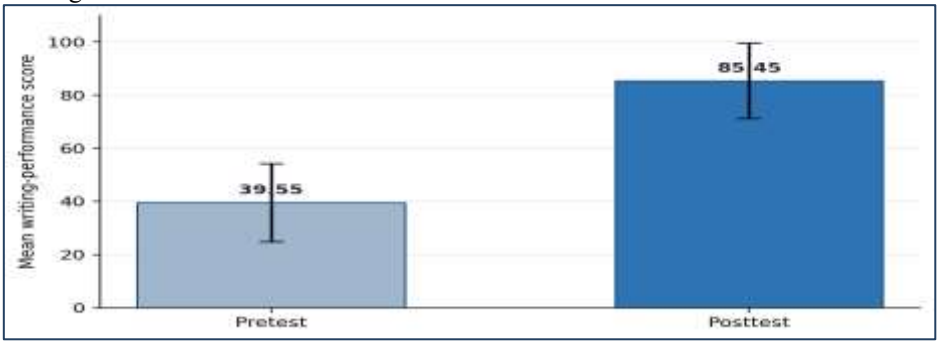
3.1 Change in Writing-Performance Scores

All 11 Grade 1 Santan pupils were represented in the aggregate pretest and posttest summaries. The mean pretest score was 39.55 (SD = 14.69), while the mean posttest score was 85.45 (SD = 14.21). The difference between these means was 45.90 points, indicating a substantial increase over the implementation period.

Table 1. Pretest and Posttest Writing-Performance Scores of Grade 1 Santan Pupils

Assessment	n	Mean	SD	Absolute mean change
Pretest	11	39.55	14.69	—
Posttest	11	85.45	14.21	+45.90

Figure 1. Mean Pretest and Posttest Scores with Standard-Deviation Error Bars



3.2 Paired Comparison

The study recorded a paired-samples result of $t(10) = -15.30$ with $p = .005$ and a decision to reject the null hypothesis at $\alpha = .05$. On the basis of the study's p value, the pretest–posttest difference was statistically significant. The negative sign reflects the order used when subtracting the posttest from the pretest; it does not indicate a decline.

Table 2. Paired-Samples Test a

Comparison	Pretest M	Posttest M	df	t	p	Decision
Pretest vs. posttest	39.55	85.45	10	−15.30	.005	Reject H_0

3.3 Teacher-Recorded Implementation Insights

Active hands-on participation: Pupils participated in sorting, filling, picking, and related activities and used indigenous or locally available materials during hands-on work.

Responsiveness to brief time limits: The teacher noted that setting a time limit encouraged pupils to remain alert and complete the manipulative tasks within the expected period.

Value of repeated opportunities: Providing sufficient and repeated manipulative experiences was viewed as important for developing fine motor control.

Interest and enjoyment: The varied activities appeared to hold pupils' interest because they were concrete, playful, and different from routine seatwork.

Excitement and positive affect: Pupils reportedly showed excitement and positive reactions during implementation, which the teacher associated with greater engagement in learning.

Taken together, the teacher's records portray the intervention as feasible, engaging, and compatible with the classroom routine. These observations support the acceptability of the approach from the implementing teacher's perspective, although they do not substitute for independent observation or direct pupil feedback.

4. Discussion

The study documented a marked increase in aggregate writing-performance scores following implementation of the Imagination Tree routine. The posttest mean exceeded the pretest mean by 45.90 points, while variability remained similar across occasions. Within the limits of a one-group design, this pattern suggests that the participating class performed written tasks more successfully at the end of the intervention period than at baseline. Teacher observations also indicated that pupils engaged readily with the activities and became accustomed to completing short tasks within a defined time.

The result is educationally plausible because the intervention addressed several component demands of early writing. Picking up seeds, threading beads, placing objects, and manipulating clay require precision grasp, controlled release, finger isolation, and bilateral coordination. Sensory writing in sand provides repeated stroke practice with low physical resistance and allows quick correction. Playdough work provides resistance that may support hand strength and movement control. When these experiences are repeated before written lessons, pupils may enter writing tasks with greater readiness to coordinate the hand, eye, and writing tool.

The findings are broadly consistent with research linking early fine motor competence to school performance. Grissmer et al. (2010) found that fine motor measures near school entry predicted later academic outcomes, while Cameron et al. (2016) emphasized the interdependence of motor coordination, executive function, and visuospatial processing. Seo (2018) likewise reported a relationship between fine motor skills and handwriting legibility. The present classroom data add a context-specific example from a small island-province school, showing how locally available materials can be organized into a repeatable routine.

The pattern also accords with intervention literature, but the match should not be overstated. Taverna et al. (2020) found improvements in visual–motor integration after a structured program for kindergarten and first-grade pupils, with differential responses across children. Li-Tsang et al. (2023) reported gains across several handwriting-process and sensorimotor outcomes after a group intervention and noted that spacing practice across time may matter. In the Imagination Tree study, practice was brief but sustained across several months, a schedule that may have supported familiarity, reduced fatigue, and repeated successful performance.

Engagement is another plausible mechanism. The pupils reportedly showed interest and excitement when using local materials and game-like tasks. For beginning learners, positive affect and novelty may increase willingness to repeat a difficult movement and persist when precision is required. The time limit may also have supported pace and task focus. At the same time, competition and speed should be used cautiously. Pupils who need more time should not experience the routine as punitive; accuracy, safe tool use, and confidence should remain more important than finishing first.

A critical point is that the study assessed written-work portfolios rather than fine motor performance through a standardized test. The outcome therefore represents writing-related classroom performance, which may reflect letter formation, task completion, attention, familiarity with the rubric, regular instruction, and motor control together. It would be more precise to conclude that the intervention was associated with improved writing-performance scores than to claim that it definitively changed fine motor capacity. Future work should measure both handwriting outcomes and component fine motor skills.

The very large t statistic also requires verification. The lists $t(10) = -15.30$ and $p = .005$. Those values are reproduced to preserve the study record, but pupil-level paired scores were not supplied, preventing recomputation of the mean difference standard deviation, confidence interval, or paired effect size. A journal submission should include the raw de-identified scores or a verified statistical output. This is essential because the inferential result should be internally consistent and auditable.

The absence of a comparison group is the principal design limitation. Grade 1 pupils naturally improve over several months through maturation and regular classroom instruction, and the same writing rubric was used before and after the intervention. Any of these factors could contribute to the score increase. A wait-list comparison class, staggered implementation across sections, or multiple-

baseline design would strengthen causal inference while remaining feasible in a school setting. Repeated measures across the implementation period would also show whether improvement was gradual, immediate, or sustained.

Despite these constraints, the study offers a useful practice-based contribution. The routine is inexpensive, adaptable, short, and grounded in materials available to the school community. It also shows how a teacher can translate an observed classroom difficulty into a structured intervention, collect evidence, and reflect on implementation. The strongest practical interpretation is that the Imagination Tree is a promising classroom support worthy of replication and refinement rather than a fully validated program.

4.1 Implications for Classroom Practice

Teachers may use short manipulative routines as preparation for writing, particularly when pupils show difficulty with grasp, coordination, stroke formation, or task completion. Activities should progress from larger, easier objects toward smaller objects and more precise placement; pupils should receive demonstrations and feedback; and sessions should remain brief enough to avoid fatigue.

Motor activities should be explicitly connected to writing. Evidence from handwriting research indicates that handwriting instruction itself is important; motor exercises alone may not consistently improve legibility or fluency (Santangelo & Graham, 2016). A balanced routine can therefore pair Imagination Tree tasks with direct modeling of letter strokes, guided practice, opportunities to write meaningful words, and feedback on accuracy and fluency.

Locally available materials can improve feasibility, but safety and accessibility require attention. Seeds and beads should be appropriately sized and supervised, especially for younger pupils. Alternatives should be provided for children with allergies, sensory sensitivities, visual limitations, or motor conditions. Performance expectations should be individualized so that a brief time target encourages focus without excluding pupils who need accommodations.

5. Conclusion

Grade 1 Santan pupils showed substantially higher writing-performance scores after participating in the Imagination Tree routine. The classroom activities used short, repeated, play-based manipulation of local materials to exercise precision grasp, hand–eye coordination, dexterity, strength, stroke practice, and task focus. Teacher records further suggested that pupils found the routine interesting and participated actively.

These results support continued exploration of the Imagination Tree as a feasible classroom support, particularly in settings where specialized equipment is unavailable. They do not establish that the intervention alone caused the improvement or that a standardized fine motor construct changed. The most defensible conclusion is that the routine was associated with improved rubric-based writing performance and positive classroom engagement in this small class during the implementation period.

5.1 Recommendations

- Basco Central School may pilot the routine in other Grade 1 or kindergarten classes using a common implementation guide, safety procedures, and fidelity checklist. Teachers should combine the manipulative tasks with direct handwriting instruction and individualized support.
- A replication should include a comparison condition or staggered rollout, repeated measurements, and follow-up testing. Pupil-level de-identified data should be retained so that the paired analysis, confidence interval, and effect size can be independently verified.
- Future studies should use a standardized fine motor or visual–motor measure together with handwriting legibility, accuracy, and fluency outcomes. Independent scoring or inter-rater reliability should be documented.
- Further research may examine the intervention with kindergarten pupils, learners receiving remedial instruction, and children in special education, provided that tasks and ethical safeguards are adapted to their needs.

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