

THE EFFECTIVENESS OF INNOVATIVE TEACHING TOOL (PROJECT PAGSULAT) TO ENHANCE HANDWRITING SKILLS OF GRADE 1 PUPILS IN CATEEL CENTRAL ELEMENTARY SCHOOL

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ABSTRACT

There is a need to teach children the appropriate ways to write before they develop bad writing practices whereas, early handwriting development provides the foundation for future writing well into elementary school and beyond (Bharathi, 2022). In this context, this research study aimed to enhance the handwriting skills specifically in printed of Grade 1 pupils in Cateel Central Elementary School through the use of PROJECT PAGSULAT. This study utilized the pure experimental design as the method of conducting this quantitative research. The respondents of the study was Grade 1-Chastity and it was identified through a toss coin. The instrument used for collecting data was the researchers made pre-test and post-test questionnaires and it was rated by way of a rubric. The mean and independent sample t-test was the statistical tool utilized in quantifying the gathered data. After the research study procedures was completed it reveals that the level of handwriting skills in their pre-test scores of experimental group were remarked did not meet expectation. In terms of the level of thier post-test scores the experimental group were remarked outstanding. It also found out that there is a significant difference between the pre-test and post-test scores when correlated. Moreover, this study had found out that Project Pagsulat tool is effective. These findings was attributed much through the application of Closed-Loop Model.

Keyword: *PROJECT PAGSULAT, innovative teaching tool, handwriting skills in printed*

1. INTRODUCTION

Handwriting is an essential skill to develop since children spend up to 60% of their time at school writing (Gargot et al., 2020). At a young age, pupils who can acquire handwriting abilities have less difficulty communicating and with general literacy (Spear-Swerling, 2022). Handwriting has been shown to boost brainpower, and memory aid, improve motor skills, and become a gateway to reading (MacFarland, 2015). Like all learning problems, difficulties in writing can be devastating to a child's education. As Kelly (2013) emphasized, children must master these skills before being expected to write to avoid frustration at failure and subsequent avoidance of future writing tasks. According to the World Statistics Institute (2011), in Tanzania, it was noted that there are some primary school children facing problems in writing. It has been estimated that worldwide, 27% of primary school children encounter problems with writing skills. It was reflected in the study of Pembe and Bali (2019) in Zambia, which indicates that 59% of 120 primary school children faced difficulties writing the word 'at' while 60% faced difficulties writing 'bag.' With a good ability to write, the students will experience an easier challenge in expressing themselves in written form, and it will prevent a barrier in communication with others in the education environment or their work circumstances (Klimova, 2012). In the Philippines, a recent study by Felipe (2020) stated that Filipinos lag in writing, indicating that from 28% percent level of proficiency and literacy, only 1% of Filipino learners have developed writing skills based on Southeast Asia Primary Learning Matrix (SEAPLM). Out of 79 countries that participated in the Program for International Student Assessment (PISS), the Philippines ranked lowest in literacy skills; this finding contributed much when the total writing skills rating is 3.57% (Gatchalian, 2018). Additionally, among Filipinos five (5) years old and over in Central Visayas stipulated in the Philippine Statistics Authority Survey (2019) that rural areas show a low level of proficiency, having a rating of 77% in terms of basic literacy that includes reading and writing. The factors affecting the poor writing skills of elementary pupils include the lack of motivation and interest and has lack of foundation of such significant skills in Kindergarten (Saaverada, 2020).

In Cateel Central Elementary School, one of the primary teachers stated that one of the learning difficulties that can be observed is poor handwriting skills. Students can write their names correctly. However, their penmanship was not good as expected, and

pupils could not follow blue-red-blue and sometimes overlap. He/she also added that pupils do not know how to write letters once dictated, for they sometimes interchange letters b and d. The problems mentioned above in handwriting difficulties are actively observed. The issue with how primary school students express themselves through their handwriting is a major factor in their challenges and a big contributor to their failure, underachievement, and loss of ambition for academic performance (Oche, 2014). As supported in the study of Bamidele (2017), there is handwriting that is clear and easy to read, and then there is handwriting that is hard to read. Bad handwriting sometimes includes misuse of upper and lower case letters, for example, writing b in place of d, p in place of q, writing inappropriately written in the lines, letters and words with incorrect spacing, and many more. Thus, poor handwriting may make the written work of children with learning disability to be difficult to decipher, leading to distortion in the communication process (Bamidele, 2017). With this circumstance, there is a need to conduct action research to enhance writing skills through innovative teaching tools. This study was focused on handwriting skills, specifically in print. As such, this study discussed significant areas and variables under the study. Also, this study hopes that the result will determine the effectiveness of the provided intervention of "Project Pagsulat."

2. REVIEW OF RELATED LITERATURE

This study focused on writing skills, specifically in the handwriting of the students. As such, this chapter presents and discusses the following research topic: the importance of handwriting skills, factors affecting handwriting, handwriting difficulties, ways to improve handwriting, and the relevance of innovative teaching tools to enhance handwriting skills.

2.1 The Importance of Handwriting Skills

Early handwriting development provides the foundation for future writing well into elementary school and beyond. It is essential to teach children the appropriate ways to write before they develop bad writing practices (Bharathi, 2022). Handwriting practice in early childhood may enhance letter recognition and processing, which are foundational steps for reading acquisition (James & Engelhardt, 2012). Researchers have linked fine motor, perceptual motor, and writing ability in early childhood to later academic achievement in elementary school (Dinehart, 2015). Researchers also suggest many benefits of handwriting, including the child's brain, motor, and memory development (McFarland (2015). According to Bharathi (2022), good handwriting has many benefits for kids. It is a great skill that helps a child in the long term. Building a favorable image of the child may also boost their spirits, memory, focus, and hand-eye coordination.

(1) Brain Benefits; handwriting is beneficial for the brain. It has been suggested that handwriting may activate brain activity in young children. For the brain to reach its optimal efficiency, it is necessary to learn handwriting (Klemm, 2013). Handwriting trains the brain to integrate visual and tactile information and fine motor dexterity. When a student is writing, it has been shown that multiple brain areas become activated during the learning process. Instead of typing or visual practice, the brain is not just charged or activated. It forms connections that offer high-level thinking skills. Brain scans have revealed that children exhibit almost adult-like processing when writing, as opposed to when typing (Education Week, 2012). Further, when a child is taught to write actively rather than passively, his/her brain is impacted, and their writing legibility and fluency will be enhanced (Seton, 2012). (2) Motor Development Benefits; handwriting helps a child develop crucial motor skills. Preschool is an opportune time in a child's development to teach fine motor skills. One of these skills that is commonly taught at this age is handwriting. Learning to handwrite has cognitive and motor benefits (Education Week, 2012). Handwriting is an important way to hone and develop these fine motor skills. It is a combination of complex movements. It includes visual perception, fine motor skills, and the development of cognition (Stevenson & Just, 2012). (3) Memory Benefits; handwriting is a powerful tool that aids in memory. Active activities like handwriting have been proven to help a child retain more, whereas passive activities like typing or tracing cannot promise the same results. The instructional method affects how the child's brain stores the memory (Seton, 2012). For young children, memorizing how to form letter shapes is key. There needs to be more than typing alone to teach this process. Making the letter shapes by hand is needed to help the brain remember how to form and duplicate the letters later. Typing is confusing to teach young children when they begin to write because hitting a key on the keyboard has nothing to do with a letter's actual shape or formation (Stevenson & Just, 2012). Memory is also helpful when a student takes notes by handwriting them. This process causes the student not to write down words verbatim but rather to analyze them and synthesize them into a summary they then write down.

Further, pre-writing skills are the basics of good and proper handwriting. It teaches the child how to write letters and gives scientific strategies for all-over child development. Pre-writing skills improve fine motor skills, which is important for later academic success. Pre-writing skills improve visual-motor development which helps to read, write and spell better. Gives the child basic support before starting proper writing. Emotionally and mentally, they got prepared by pre-writing skills. Moreover, children become more comfortable with color senses, pattern senses, and pencil grip that make writing comfortable for them Aussie Childcare Network (ACN, 2022).

2.2 Factors Affecting Handwriting

Handwriting is one of the first things children are taught at school, and they must perform efficiently throughout life (Parush et al., 2022). As Gargot et al. (2020) mentioned, formal handwriting acquisition begins at age five (preschool) and takes around ten

years of practice to attain almost automation. During this time, handwriting first develops on a quality level (from first to fifth grade) and then on a speed level (handwriting speed mostly develops from the fourth grade onwards). While there has not been any mention of handedness having an impact, it is interesting to note that there is a gender effect in handwriting acquisition, with girls showing somewhat higher quality and speed scores than their male contemporaries. In early and middle childhood, fine motor, perceptual motor, and handwriting abilities are related (Klein et al., 2013). Handwriting depends on "motor, perceptual, cognitive, and linguistic abilities" (Maldarelli et al., 2015). Proper handwriting requires fine motor skills, visual perception, cognition integration, and maturation (Shams & Kim, 2015). Therefore, fine motor skills are important because correctly formed letters can only be produced with force control and proper timing of coordinated finger, hand, and arm movements. Many basic skill components will interfere with handwriting performance. Before starting the handwriting process, children must develop preparation skills to form letters, such as developing large and small muscles, visual perception, fine motor skills, and hand manipulation skills (Sinan, 2019). When copying letters and words, children need not only to keep the task in mind, attention, and visual and manual coordination but also control fine movements and enough power of the finger and the hand (Stevenson and Just, 2014). It is seen that motor competence measures related to handwriting production indirectly affect handwriting in school-age children. Acquiring handwriting skills at the beginning of education is the basis of future academic success. It is seen that handwriting errors in the first grade of primary school are related to academic achievement up to 6th grade (Sinan, 2019).

Fine motor control and coordination of visual and manual movements are necessary for children to copy letters (MacDonald et al., 2016). Fine motor skills also play an important role in sustaining people's daily lives (Linde et al., 2013). Fine motor skill competence is an essential component of daily life activities. Poor fine motor skills can cause increased anxiety, distress in academic achievement, and poor self-esteem (Gaul & Issartel, 2016). Many professionals have examined the importance of fine motor, perceptual motor, and handwriting development and their connections. Attention, executive function, and future academic success in reading and math have been linked to early childhood fine motor and/or perceptual-motor abilities (MacDonald et al., 2016). More specifically, the ability to copy forms (including letters and shapes) significantly positively affected math scores for primary school students (Grissmer et al., 2013). Handwriting may facilitate reading acquisition and letter recognition in young children (James & Engelhardt, 2012). Failure to attain handwriting competency during school often negatively affects academic success and self-esteem. This complex occupational task has many underlying component skills that may interfere with handwriting performance. Fine motor control, bilateral and visual-motor integration, motor planning, in-hand manipulation, proprioception, visual perception, sustained attention, and sensory awareness of the fingers are some of the component skills identified (Sinan, 2019). Poor handwriting may be related to intrinsic factors, which refer to the child's actual handwriting capabilities, extrinsic factors, which are related to environmental or biomechanical components; or both. Handwriting performance must be evaluated using a valid, reliable, standardized tool, informal classroom observation, and teacher consultation. Studies of handwriting remediation suggest that intervention is effective. Evidence indicates that handwriting difficulties do not resolve without intervention and affect between 10 and 30% of school-aged children. Despite the widespread use of computers, legible handwriting remains an important life skill that deserves greater attention from educators and health practitioners (Sinan, 2019).

Intrinsic Factors; these factors are under the writer's control. Intrinsic factors include the temperamental disposition of the child, certain cognitive skills, and the underlying neural and physiological systems that support and are engaged in the process of control. Some examples of such factors are visual-motor control and cognitive skills, emotional state, physical ability, and neuromuscular coordination of the learner (Pooja, 2021). **Extrinsic Factors;** these factors are not under the control of the writer. It includes how caregivers shape and socialize the emotional responses of the child. Caregivers may utilize specific cultural, socio-ethnic appropriate behavioral strategies to enhance the development of self-control by providing supportive and responsive environments to the child. Some examples of such factors are the national writing system, occupation, learning environment, and age of the learner (Pooja, 2021). According to Smith (2017), reinforcement is an extrinsic stimulation that occurs after and is dependent upon a behavior, increases the likelihood that a behavior will occur, and increases the likelihood that a behavior will be repeated. According to Cherry (2018), the most straightforward way to think about positive reinforcement is that something enjoyable is added when a particular activity is carried out.

2.3 Difficulties in Handwriting

Approximately 12-25% of school-age children experience difficulty with handwriting. Despite the growing use of computers and technology in the classroom, handwriting remains an essential life skill, and thus, a large portion of school-age children are faced with the consequences of poor handwriting (Zwicker & Montgomery, 2012). The recent study by Parush, Levanon-Erez, and Weintraub (2022) revealed that children with poor handwriting had inferior pencil, paper, and body positioning, stabilization of paper, and consistency of pressure compared to children with good handwriting. The implications of handwriting difficulties are numerous and have been well documented. For example, difficulty with handwriting requires greater attentional resources to be directed to letter formation, which can interfere with a child's confidence and competence as a compositional writer (Donica, 2018). Poor legibility can interfere with teachers' perceptions and grading of student's written work, and slow handwriting speed can contribute to incomplete assignments or increased time to finish written work. Academic failure and lowered self-esteem can result from problems associated with poor handwriting (Zwicker & Montgomery, 2012). It is considered that children's handwriting disturbs and lowers the quality of their text until they can generate letters fast and properly. A recent study by Skar et

al. (2021) on handwriting fluency predicted the quality of primary-grade kids' writing on a functional writing assignment. Their research demonstrates that gender disparities increased over grades, girls had faster handwriting than boys, and handwriting fluency rose from one grade to the next. This means a relationship exists between primary-grade students' attitudes and writing quality. This finding supports the theoretical proposition in the WWC model (Graham, 2018) that writing depends, at least in part, on the beliefs students bring to the task of writing.

A recent study by Sinclair and Szabo (2015) stated various reasons why some people have handwriting problems. One of these reasons is the internal factor within the child, which consists of ideas such as fine motor skill development and attitude toward writing. The second reason concerns external factors, including pencil size, writing time, and the teacher's instructional approach toward writing. Lack of motor skills is one reason for poor handwriting. Another reason for handwriting problems is the pencil size. However, recommendations regarding the best pencil size are conflicting. This is important to note, as research has shown that fine motor skills are the strongest predictor of special education referrals and the second strongest predictor of kindergarten retention (Cameron et al., 2012). Dysgraphia, or problems with legibility or speed while writing, can significantly negatively impact a child's scholastic and behavioral growth (Gargot et al., 2020). Children immediately struggle to keep up with the increasing cognitive demands of schoolwork as they struggle to automatize their handwriting, which results in an increase in weariness and a decline in cognitive function. Therefore, poor writing performance in dysgraphia children leads to negative comparisons with others and self-criticism. It consequently increases anxiety about academic achievement and, in boys especially, can increase trait anxiety, which can last into puberty. This typically leads to avoiding academic writing assignments, which may eventually cause anxiety and low self-esteem, leading to a vicious cycle of fewer and fewer possibilities for writing instruction and, ultimately, school refusal (Gargot et al., 2020). Dysgraphia can be connected to linguistic issues, motor learning and/or motor execution, visual-motor issues, coordination issues, or cognitive impairments (such as attention deficit disorder), given the conditions for learning to write by hand. Therefore, dyslexia, developmental coordination impairments, or attention deficit disorders with or without hyperactivity (ADHD) can all be present alongside dysgraphia (Sato et al., 2016).

2.4 Ways to Enhance Handwriting

Handwriting involves a complex set of skills. However, there are some simple ways you can help if your child has messy handwriting. Learn how low-cost tools like pencil grips can help your child improve handwriting. Moreover, get ideas to add fun to kids' handwriting practice (Rawe, 2023). Four (4) ways of writing tools to enhance handwriting skills proposed by Captiva Marketing (2020) include: (1) Slant boards are commonly used to raise the height of the paper off the table so that children can more easily see what they are writing and better manipulating their writing utensil. (2) Pencil grips are common tools used to increase comfort for anyone as they write. (3) While regular pencil grips can help children with minor coordination issues, weighted tools are often more effective when more significant coordination issues must be addressed. (4) Writing-specific tools are not the only way to deal with handwriting troubles. Sensory trays provide a more sensory way to build and strengthen essential handwriting skills. These tools involve using sand, clay, rice, shaving cream, or other materials to practice handwriting in a more creative and relaxing setting (Captiva Marketing, 2020). According to Rawe (2023), there are six (6) ways to enhance a child's handwriting skills: (1) buy a pencil grip. Pencil grips are low-cost tools that help kids learn to hold a pencil properly. These tools can help kids write more neatly without their hand muscles getting tired; (2) make a slant board. It can encourage children to write on a slanted surface. The right slant can improve the position of your child's wrist and shoulder; (3) raise the lines on lined paper. When dry, the raised lines help kids learn to stay within the lines. Kids can feel it if they "bump" into the lines with their pencil; (4) use a spacing tool. Use a wooden craft stick as a spacing tool. Further, encourage children to keep it simple so the spacing tool looks fun but not distracting; (5) play "Sky, Grass, Dirt." Here are two ways you can play using a word like hops – (5.1) use hand signals and (5.2) use highlighters on lined paper; and (6) talk with your child's teacher. When kids struggle with handwriting, it does not mean they are not smart. However, messy handwriting can get in the way of learning since it can keep kids from showing what they know.

Moreover, as stated by Pappas (2022), the 6 ways to enhance handwriting include (1) Letter Practice Worksheets. These worksheets can be helpful for children to learn more about letter formation, but the rote repetition can be less engaging for some; (2) Journals With Handwriting Paper. Blank journals can be another beneficial tool for handwriting practice, especially ones with "handwriting paper," or guided lines, on the bottom half of the page and a blank space for drawing on the top. Children can draw a picture in the blank space and then write about it, which boosts engagement and focus; (3) Try Slow Writing. One fun technique that can help children slow down is to have them practice writing a letter or word to a slow beat. It can be a slow, rhythmic song, a slow metronome, or a drum beat; (4) Use Alternative Materials. Another way to get acquainted with letter formation is to use alternative materials to make letter shapes and simple words. Writing in clay or sand, making letters out of Wiki Sticks, blocks, or pebbles, and painting letters can all refamiliarize students with letter formation; (5) Build Fine Motor Skills. Building fine motor skills and muscles is also crucial to handwriting. For younger children, using tweezers to pick up small items, spraying with spray bottles, and working with lacing activities can all be beneficial in strengthening the muscles in the hand necessary for writing; (6) Build Vocabulary. Having a strong and varied vocabulary really boosts reading and writing skills. Focusing on familiar topics and filling them with words that a child is confident in using in a sentence can build their ability to read and write.

2.5 The Relevance of Innovative Teaching Tools to Enhance Handwriting Skills

Children who lack fine motor skills, notably design copy skills, are likely to fall behind in other academic areas (Cameron et al., 2012). Implementing specific interventions may be critical to helping students strengthen fine motor skills in the early years of schooling, which could lead to later academic success. Specifically, interventions may help students develop writing skills to become successful writers (Keifer, 2015). Academic, functional, cognitive, behavioral, and social skills that directly impact a child's capacity to receive an education should be addressed through educational interventions, which give children the assistance they need to learn the skills taught by the educational system (Lestrud, 2013). Now an intrinsic part of school life, interventions in education allow teachers and teaching assistants to address any gaps in a child's progress or attainment. Once a need has been identified, effective interventions can then be used to overcome any barriers to the child's learning. Interventions often describe a focused teaching session that deviates from existing teaching practice (Hawthorne, 2021). The Journal of Occupational Therapy, Schools, and Early Intervention recently published a systemic review on handwriting acquisition and interventions for handwriting for preschoolers through second grade (Fancher, Priestley-Hopkins, & Jeffries, 2018). The results indicated that writing letters in late preschool contributes to letter recognition. Elementary students do better when handwriting is explicitly taught. Legibility improves with adequate practice. Interventions based on motor learning theory and cognitive learning strategies are effective in improving legibility remediation of performance deficits were not shown to be effective.

According to Naga Subramani & Iyappan (2018), advanced pedagogy is the best technique to improve teaching and learning outcomes. Around the world, several cutting-edge teaching techniques are presently in use. If we want to inspire kids to study and to be enthusiastic about their studies, we must use cutting-edge teaching and learning techniques. The role of education is to ensure that while academic staff does teach, what is taught should also be intelligible to students emanating from culturally and linguistically diverse backgrounds and that they rapidly become familiar with the expected standards. It is more often than not the case that students underachieve because they have yet to grasp an awareness of the level of assessment or what the lecturer expects from them.

Innovative educational competency refers to the ability to integrate subject knowledge, pedagogical aspects, and learning psychology to achieve the development of students understanding of the topics taught (Runesson & Runesson, 2015). Lecturers should thus apply themselves to utilizing innovative methods so that the student's learning process is as free-flowing as possible and that their methodology is conducive to learning. Innovative teaching and learning methodologies such as short lectures, simulation, roleplaying, portfolio development, and problem-based learning (PBL) are very useful in addressing the rapid technological advances and developing workplaces that will be required in the foreseeable future (Naga et al., 2018). Further, according to Captiva Marketing (2020), there are various tools that teachers, parents, caregivers, and other adults can help children use to enhance their writing abilities. These tools also help improve a child's fine motor skills and ability to write and learn additional skills as they grow. While some handwriting tools are more complex and may require training and supervision from an occupational therapist or other healthcare professional, there are handwriting tools that teachers and parents can implement at home.

3. METHODOLOGY

3.1 Research Design

This study utilized a quantitative research design following the data collection process of a pure experimental method. As such, this study demonstrated the effectiveness of the innovative teaching tool through pre and post-intervention in the experimental group. This study employed the researcher's pre-test and post-test assessments and was rated accordingly through a rubric.

3.2 Research Instrument

The data gathering instrument was the researcher-made pre-test and post-test questionnaires. The content of the questionnaires was anchored to the handwriting lessons cited by the researchers in the K-12 curriculum guide that contextualized handwriting skills. Moreover, the researchers used a rubric in rating these instruments.

Table 1: Handwriting skill rubric

Name:		Grade & Section:		Date:	
Learning Competency: Pagkopya ng Titik (KPKFM-00-1.4)					
Learning Task: Writing Upper and Lower Case Letters of the Alphabet					
Criteria	Rating				Score
	Exceeds Expectations (4)	Meets Expectations (3)	Need Some Practice (2)	Need Much Practice (1)	

Shape	40 letters and above match the same measure with the provided example	25 - 39 letters match the same measure with the provided example	15 - 24 letters match the same measure with the provided example	14 letters and below match the same measure with the provided example	
Size	40 letters and above are sized appropriately; upper case letters are capitalized; lower case letters are constantly of the same size	25 - 39 letters are sized appropriately; upper case letters are capitalized; lower case letters are constantly of the same size	15 - 24 letters are sized appropriately; upper case letters are capitalized; lower case letters are constantly of the same size	14 letters and below are sized appropriately; upper case letters are capitalized; lower case letters are constantly of the same size	
Form	40 letters and above are drawn with straight lines and appropriate curves; circles are closed when appropriate	25 - 39 letters are drawn with straight lines and appropriate curves; circles are closed when appropriate	15 - 24 letters are drawn with straight lines and appropriate curves; circles are closed when appropriate	14 letters and below are drawn with straight lines and appropriate curves; circles are closed when appropriate	
Line	40 letters and above are correctly placed on the line; they do not float or hang below unless appropriate	25 - 39 letters are correctly placed on the line; they do not float or hang below unless appropriate	15 - 24 letters are correctly placed on the line; they do not float or hang below unless appropriate	14 letters and below are correctly placed on the line; they do not float or hang below unless appropriate	
Space	40 letters and above are of the same equal distance; capital letters are partnered with their lower case letters and are constantly written with even spacing	25 - 39 letters are of the same equal distance; capital letters are partnered with their lower case letters and are constantly written with even spacing	15 - 24 letters are of the same equal distance; capital letters are partnered with their lower case letters and are constantly written with even spacing	14 letters and below are of the same equal distance; capital letters are partnered with their lower case letters and are constantly written with even spacing	
Total					

3.3 Respondents of the Study

The respondents of this study were Grade 1 pupils in Cateel Central Elementary School. The researchers performed a toss coin in selecting the respondents. As such, it identified Grade 1-Chastity as the experimental group. These respondents came from the lower section, and the baseline in selecting them was based on the criteria by which the pupils were identified to have difficulty forming letters through their shape, form, size, line, and space. Further, the experimental group consisted of 22. These selected respondents are experiencing handwriting problems which are also the primary objective of enhancing them during the study.

4. RESULTS AND DISCUSSION

This section presents the discussion on the presentation and analysis of findings. This chapter emphasized the correlation of the relationship between the two variables, specifically on Project Pagsulat intervention as independent and handwriting skills enhancement as the dependent variable.

4.1 Pre-test Scores of Experimental Group

Pre-tests were given before administering the actual intervention of Project Pagsulat. Presented in Table 3, the analyzed results in their level of pre-test scores reveal that the experimental group had a mean score of 9.82 and a grade percentage of 74.55, which implied that their level of handwriting skill performance did not meet expectations. Based on the result, the experimental group who participated in this study is seen to be problematic regarding handwriting skills, specifically in printing.

Table 2: Level of pre-test scores of the experimental group

Group	Total Score	Standard Deviation	Mean	Grade Percentage	Remarks
Experimental	20	1.84	9.82	74.55	Did Not Meet Expectations

According to a recent study by Zwiker and Montgomery (2012), approximately 12-25% of school-age children are poor in handwriting despite the growing use of computers and technology in the classroom. Children with poor handwriting had inferior pencil, paper, and body positioning, stabilization of paper, and consistency of pressure compared to children with good handwriting (Parush et al., 2022). As emphasized by Sinclair and Szabo (2015), there are various reasons why some people have handwriting problems. One of these reasons is the internal factor within the child, which consists of ideas such as fine motor skill development and attitude toward writing. The second reason concerns external factors, including pencil size, writing time, and the teacher's instructional approach toward writing. Lack of motor skills is one reason for poor handwriting. The pencil size is another reason for handwriting problems (Sinclair & Szabo, 2015). Poor legibility can interfere with teachers' perceptions and grading of student's written work, and slow handwriting speed can contribute to incomplete assignments or increased time to finish written work. As such, it will result in problems associated with poor handwriting, such as academic failure and lowered self-esteem (Zwicker & Montgomery, 2012).

Further, the result clearly shows that the experimental group who participated in the study, as reflected by the result of their pre-test, were diagnosed to be poor in handwriting skills. With this, the researchers determined the difficulties that caused their failure during the test, which was dealt with seriously, so it required efficient exercises, strong facilitation, and the need to conduct the intervention to enhance pupils' handwriting skills.

4.2 Post-test Scores of Experimental Group

After carefully administrating the tool Project Pagsulat, the researchers fulfilled all the activities provided and successfully secured a favorable result in their post-test assessment from the respondents. Table 4 shows the analyzed result in the post-test scores of the experimental group. It reveals a large gap in their scores compared to their pre-test, whereas, on their post-test, the experimental group got a mean score of 16.18 with a grade percentage of 90.45, which means outstanding. Based on the result, the researchers can concur that the provided intervention of Project Pagsulat is effective, considering that their scores were improved after realizing all the activities provided by the tool.

Table 3: Level of post-test scores of the experimental group

Group	Total Score	Standard Deviation	Mean	Grade Percentage	Remarks
Experimental	20	1.82	16.18	90.45	Outstanding

The factors affecting the post-test results were made upon the utilization of innovative teaching methods such as short lectures, simulation, roleplaying, portfolio development, and problem-based learning (PBL), which are very useful in addressing the rapid technological advances and developing workplaces that will be required in the foreseeable future (Naga et al., 2018). The recent study by Fancher, Priestley-Hopkins, & Jeffries (2018) about handwriting acquisition and interventions for handwriting for preschoolers through second grade indicated that writing letters in late preschool contributes to letter recognition, while elementary students do better when handwriting is explicitly taught. Legibility improves with adequate practice. Interventions based on motor learning theory and cognitive learning strategies effectively improve legibility remediation and handwriting performance was effective (Fancher et al., 2018). As highlighted by Captiva Marketing (2020), there are various tools that teachers, parents, caregivers, and other adults can help children use to enhance their writing abilities. These tools also help improve a child's fine motor skills and ability to write and learn additional skills as they grow. While some handwriting tools are more complex and may require training and supervision from an occupational therapist or other healthcare professionals, there are handwriting tools that teachers and parents can implement at home (Captiva Marketing, 2020).

Further, the result also contributed much to utilizing the closed-loop motor learning theory. Closed Loop is considered one of the most significant theories that provide necessary concepts for teaching handwriting skills. This model helped achieve the favorable result by providing sufficient activities that can sustain the needs of the learners as well as a continuous practice, correction of errors, and feedback until the proper acquisition of handwriting skills was attained. As stated in the study of Laszo and Bairstow's (2016) Closed-Loop Theory concerning how to teach fine motor skills, handwriting is considered a perceptual-motor skill that requires time of practice, correction of an error, and feedback to attain movement automation. The administration of the close loop model greatly helped the pupils slowly and carefully learn and acquire the fundamentals of handwriting skills. In the recent study of Longstaff and Heath (2016), it was underlined that testing writing-impaired patients using a close-loop method led to adequate writing progress in terms of using the right strokes and increased writing accuracy. Additionally, even though poor handwriting can have a negative impact on students' self-esteem and motivation and may affect their total literacy skills, a

handwriting intervention may be a gateway to helping students develop a stronger foundation of literacy skills and, in turn, a more positive perspective on writing and reading (Selness, 2022). In order to fulfill the goal of enhancing the handwriting skills of the pupils, there is a need to initiate the method of teaching handwriting using the Closed-Loop Model.

4.3 The Difference between the Pre-test and Post-Test Scores of the Control Experimental Group

Pre and post-test assessments will be measured and interpreted to reflect the effectiveness of the intervention, as shown in Table 5, the differences between the pre-test and post-test scores of the experimental group. Based on the result, it has been found that their pre-test and post-test scores differ significantly, as reflected by the t-value of 18.428 with the corresponding p-value of 0.000. This finding was attributed much to the pre-test being administered before the intervention. As stated by Kuehn (2023), students' scores are expected lower on the pre-test because they have yet to study the tested material; in most cases, their scores are close to the bottom of the class. Kuehn (2023) added that many of these weak students do not even finish answering all of the questions on the test, especially when it comes to complex tasks. During pre-testing in writing by hand, the level of handwriting skill performance was slightly moderate, considering that the intervention was not yet been administered. This test is often the first time a student is exposed to new terms, concepts, and ideas to determine their previous knowledge and understanding of the lesson (Kelly, 2019).

Table 4: Mean comparison between pre-test and post-test scores of the experimental group

Types of Test	Mean	Standard Deviation	t-value	p-value	Interpretation
Pre-Test	9.81	1.84	18.428	0.000	Pre-test and post-test scores differ significantly

Obviously, it was expected that students would obtain the highest possible score in their post-test. Hence, they had already undergone an intervention by which their skills were honed and improved. This finding is supported by the recent study by Howe et al. (2013), students in the intensive handwriting practice group demonstrated significant improvements in handwriting legibility compared with students in the visual-perceptual-motor activity group. Students in the intervention group demonstrated significantly greater gains in handwriting legibility, pre-reading skills of uppercase letter recognition, lowercase letter recognition, and letter sound recognition than students in the control group (Zylstra et al., 2016). Results also showed that the handwriting intervention enhanced their handwriting skills, and they mastered how to properly draw letters considering their shape, size, form, line, and space (Semerao et al., 2019). Before the intervention was administered, the students were diagnosed to be experiencing handwriting difficulties. Children who lack handwriting skills, notably design copy skills, are likely to fall behind in other academic areas (Cameron et al., 2012). Implementing specific interventions may help students strengthen their fine motor skills in the early years of schooling, which could lead to later academic success. Academic, functional, cognitive, behavioral, and social skills that directly impact a child's capacity to receive an education should be addressed through educational interventions, which give children the assistance they need to learn the skills taught by the educational system (Lestrud, 2013).

A concentrated instruction session that deviates from standard teaching methods is frequently referred to as an intervention (Hawthorne, 2021). Now an intrinsic part of school life, interventions in education allow teachers and teaching assistants to address any gaps in a child's progress or attainment. Once a need has been identified, effective interventions can then be used to overcome any barriers to the child's learning (Hawthorne, 2021). The theory behind using intervention activities to improve handwriting is allowing the child to play, write and learn through various sensory inputs, meaningful activities, and writing programs, which will develop the underlying skills needed for successful handwriting (Occupational Therapy Website, 2023). It is where elementary students do better when handwriting is explicitly taught (Your Therapy Source Website, 2023). As stated in Your Therapy Source Website (2023), for students who struggle with handwriting, it may be a lack of fine motor skills, free play during childhood development, or a lack of muscle strength to produce legible writing. Regardless of the cause, therapists, teachers, and parents need interventions for handwriting that work best with students.

Further, these findings were achieved through articulating steps, concepts, and processes anchored on the Closed-Loop Theory figure. This paved way for how to appropriately and effectively teach handwriting skills to the pupils. It is suggested that learning reflects the development of more adaptive perceptual traces and adaptive capacities for generating movements that reduce errors between perceptual traces and actual outcomes. This theory specified significant references on how to teach fine motor skills, including the Knowledge of Result (KR), Reference Mechanism/Perceptual Trace, and Starting of Movement/Memory Trace. As such, this paved a better and more adequate teaching method for handwriting automation.

4.4 Implication to Education

Handwriting is an essential skill for children and adults because it involves more complex motor and cognitive skills, and good handwriting contributes to reading fluency, activating the visual perception of letters (Magic Link, 2023). The best strategy to improve teaching and learning outcomes is through advanced pedagogy (Naga Subramani & Iyappan, 2018). If we want to inspire and engage students' excitement for learning and their learning spirit, we must implement cutting-edge teaching and learning techniques.

This innovative educational competency refers to the ability to integrate subject knowledge, pedagogical aspects, and learning psychology to achieve the development of students understanding of the topics taught (Runesson & Runesson, 2015). After the intervention was achieved and the desired outcomes were met, the experimental group was successfully enhanced once determined to have poor handwriting skills. It was then viewed that the Project Pagsulat tool is effective and commendable in enhancing the handwriting skills of the pupils. As such, this study utilizing an innovative teaching tool as an intervention further implied:

1. Legibility improves with adequate practice. Interventions based on motor learning theory and cognitive learning strategies effectively improve legibility remediation and handwriting performances (Fancher et al., 2018).
2. Interventions based on motor learning theory and cognitive learning strategies effectively improve legibility (Your Therapy Source Website, 2023).
3. A handwriting intervention may be a gateway to helping students develop a stronger foundation of literacy skills and, in turn, a more positive perspective on writing and reading (Selness, 2022).
4. Use handwriting activities to help kids work on and improve handwriting legibility with fun ways to work on letter formation, line use, and placement (OT Toolbox, 2023).
5. Studies of handwriting remediation suggest that handwriting interventions successfully improve handwriting skills in children (Zylstra et al., 2016).
6. Close loop is an ideal theory to teach handwriting skills. Closed-Loop Theory requires remediation, constant practice, correction of errors, and feedback to acquire motor skills necessary for handwriting (Laszo & Bairstow, 2016).

5. CONCLUSION

Based on the data findings throughout the study, the researcher can conclude the following:

1. Prior to intervention, the pre-test scores of the experimental group marked did not meet expectations, meaning they were experiencing problems and difficulties in handwriting.
2. After the intervention, the post-test scores of the experimental group were marked as outstanding, which implies that their skills in handwriting were enhanced.
3. The correlation between the experimental group's pre-test and post-test scores reveals a significant difference which indicates that the innovative teaching tool is effective.

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