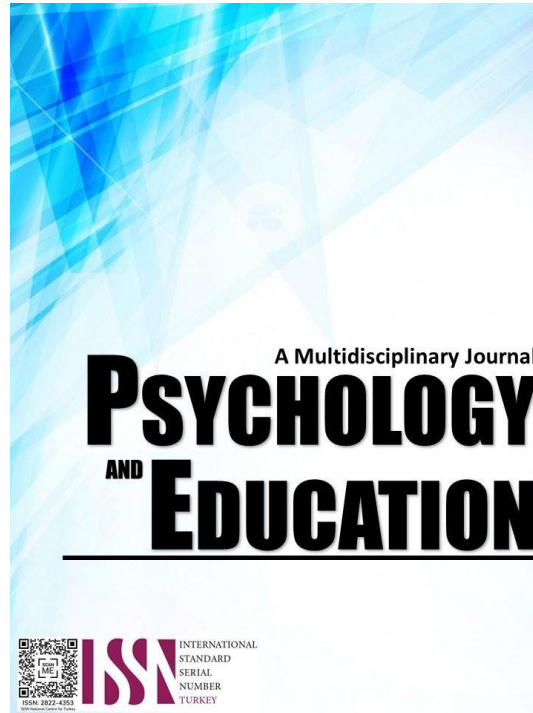


EFFECTIVENESS OF PROJECT (S.W.I.M.) SIMPLE WRITING INTERVENTION MATERIALS IN IMPROVING THE KINDERGARTEN HANDWRITING SKILLS



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Effectiveness of Project (S.W.I.M.) Simple Writing Intervention Materials in Improving the Kindergarten Handwriting Skills

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Abstract

This action research was conducted to determine the effectiveness of the project (S.W.I.M.) Simple Writing Intervention Materials for improving the handwriting skills of the kindergarten students of Talacdan Elementary School (TES) for the school year 2022-2023. Handwriting skills performance was measured using a researcher-made assessment tool through a pretest and post-test method. Project S.W.I.M. was utilized to increase the handwriting performance, then a paired T-test was used to determine the significant difference between the pretest and post-test scores. The participants' handwriting skills during the pretest are at the beginning level in terms of pencil grasp, shape formation control, letter formation with basic strokes, letter formation with curves/slanted, and overall handwriting skills. Following the intervention of project S.W.I.M., handwriting skills in terms of pencil grasp were at a consistent level. In contrast, shape formation control, letter formation with basic strokes, letter formation with curves/slanted, and overall handwriting skills were at a developing level. There was a highly significant difference between the pretest and post-test scores in participants' handwriting skills. The improvement in their handwriting skills was evident in the results of their post-test after the implementation of the project SWIM. After the intervention, the pencil grasp is at a consistent level, which is also crucial for all handwriting skills. Moreover, constant practice and increasing time spent with parents' support are encouraged to support the intervention. The project S.W.I.M. effectively improved the participants' performance in terms of their handwriting skills. Hence, it is an effective tool in helping learners develop and improve their handwriting skills, as evidenced by the increase in handwriting skills.

Keywords: *project (S.W.I.M.) simple writing intervention materials, handwriting skills*

Introduction

Teaching preschoolers for nine (9) years, the researchers encountered a range of pupils with unique personalities, diverse family backgrounds, and, most notably, varied learning styles, particularly in handwriting. Handwriting is a skill vital in the life of every human being; a skill often overlooked, focusing on other areas of the curriculum. However, research suggests that handwriting is more tied to academic achievement, especially in composition and literacy skills, as it supports letter recognition, phonemic awareness, and reading comprehension. (Mckenzie, 2019).

The handwriting skills of the pupils in the elementary grade were slowly deteriorating. According to Luminee, writing activities nowadays revolve around writing about lessons, rather than mastering writing letters and words through repetitive training. In addition, she also said that we could not decipher what most students write because of their poor penmanship. This need is not being addressed because the curriculum guide does not explicitly focus on learning to write every letter in the standard form; instead, it is integrated into other activities (Albano, 2019).

A poorly developed handwriting impacts a learner in multiple ways (Mulanya, 2020), moreover, it negatively impacts on self-esteem and worthiness of a learner, it also affects the physical behaviour like lessons attendance, sitting position in the class, completion and submission of the assignment and planning strategies of learners (Bamilde, 2017) & (Limpo, Rui, Alves, & Connelly, 2018). Furthermore, it impacts the overall academic performance through both the quality and quantity of persuasive and cognitive writing (Santangelo & Graham, 2016).

Kindergarten is the first stage in the formal education of a child. It is the most crucial part of their academic life, for they learn skills that will contribute to their future endeavor. In this stage, one of the many skills they need to acquire and master is their handwriting skill, which is a predictor of the readiness of a learner. Holding their pencil correctly, proper writing of numbers and letters, proper stroke in drawing shapes and colors, are just some of the many activities they have in a kindergarten class. During their observation of a kindergarten class in the first few weeks of the 2022-2023 school year, researchers found that most learners lacked the basic skills necessary for achieving proper handwriting proficiency. As suggested by Ray et. al. (2022), handwriting can be an effective way for students to learn important early reading and writing skills. As noted in a recent systematic review, handwriting instruction during kindergarten can improve both writing and reading outcomes, such as knowledge of letter names and sounds, spelling, and word reading.

To bridge the gap in the handwriting skills of the learner, it is but proper for the researcher to conduct an intervention to correct and enhance this skill. Improving and resolving their handwriting skill in an early stage will help the learner achieve their readiness and eliminate further difficulties. In addition, through improved handwriting skills, learners will become more confident in their studies, motivating them to study more and eventually develop a love of learning. Also, this research is in line with the 4Cs in the 21st-century learning, as it develops collaboration between the learner and teacher. It enhances their critical thinking skills by forming letters and

numbers, and ultimately enables them to communicate and express their creativity.

In Talacdan Elementary School, the majority of kindergarten pupils for the 2022-2023 school year demonstrated beginner proficiency in handwriting skills. This suggests an existing problem with the handwriting ability of the learners that needs intervention to increase their proficiency in handwriting skills, which will affect their readiness. Thus, the researchers came up with this intervention Project (S.W.I.M.) Simple Writing Intervention Materials to Improve Preschoolers' Handwriting Skills.

Research Questions

This action research aimed to determine the effectiveness of the Project (S.W.I.M.) Simple Writing Intervention Materials for improving the handwriting skills of the kindergarten of Talacdan Elementary School for the school year 2022-2023. Specifically, this aimed to answer the following questions:

1. What is the level of the handwriting skills of kindergarten learners of Talacdan Elementary School before the intervention?
2. What is the level of the handwriting skills of kindergarten learners of Talacdan Elementary School after the Project S.W.I.M. intervention?
3. Is there a significant difference in the level of the handwriting skills of kindergarten learners of Talacdan Elementary School before and after the Project S.W.I.M. intervention?

Literature Review

Handwriting can be an effective way for students to learn crucial early reading and writing skills. As noted in a recent systematic review, handwriting instruction during kindergarten can improve both writing and reading outcomes, such as knowledge of letter names and sounds, spelling, and word reading (Ray et al., 2022). On the other hand, Batao, M. et. al. (2023) cited Gargot et al. (2020) that handwriting is an essential skill to develop since children spend up to 60% of their time at school writing. Children as young as two years of age make marks on paper to express their feelings and communicate with others, Rowe, D. W., & Neitzel, C. (2010) as cited by Hall, A. (2019).

Handwriting refers to a less complex strand of development, which involves developing fine motor skills necessary to create print forms such as alphabet letters. Composing and handwriting develop alongside one another for young children to bridge their oral and written worlds. Schickendanz, J. A., & Casbergue, R. M. (2004)

Bharathi (2022) & Bharathi (2025) suggest that teaching children the appropriate ways to write is crucial before they develop bad writing practices, mainly if your child exhibits noticeable disorganized writing skills. Small changes can help improve your child's handwriting. Moreover, there are many benefits of good handwriting for kids. It is a great skill that helps a child in the long term. Apart from building a favorable image of the child, it may also boost their spirits, memory, focus, and hand-eye coordination.

Gepila (2017) noted that writing is considered to be the hardest to teach and learn. It is very challenging because it is similar to teaching a child how to swim. A child who wants to learn how to swim must be exposed to various types of swimming. Thus, several theories, principles, and practices must be taken into account. Likewise, for a child to successfully learn how to write, he must be exposed to different activities relating to writing. It is important to note that writing teachers must identify the context of learning: this includes culture, literature, and identity.

Saavedra (2020) noted that elementary pupils ought to be learning how to choose their ideas by pre-writing, organise all their chosen ideas into logical sequences by writing, and write it down with detailed explanations by rewriting, so they can start expressing their thoughts via written communication at an early age.

Onozawa (2010) also stated that the steps of the writing process are generally followed in sequence. Emphasizing different techniques can be repeated if the learners find it necessary. In other words, this process typically follows a step-by-step procedure to assist students in writing, but this does not necessarily imply a linear learning process that could limit the learners' writing styles. Learners can still achieve good written output regardless of the methods and techniques they prefer to use.

Mcilroy (2022) states that hands-on learning involves engaging with real-world materials and objects, fostering exploration and experiential understanding. Hands-on learning, characterized by active physical engagement rather than passive lecture-based instruction, is often considered one of the most effective teaching methods (Bonney, 2021). This approach aligns with John Dewey's theory of learning by doing (Marougkas et al., 2023), emphasizing that learners gain a deeper understanding when actively engaging with the subject matter (Main, 2023).

Hence, it is a promising pedagogical approach to enhance the basic handwriting skills of early childhood learners. Utilizing innovative pedagogical approaches holds significant promise in fostering the development of foundational handwriting skills among early childhood learners. By employing methods tailored to the unique developmental needs and capabilities of young children, educators can effectively enhance various aspects of handwriting, including letter formation, pencil grip, and spatial awareness. This is supported by Maris (2023), emphasizing the crucial role of hands-on writing activities in early childhood education, which can promote student engagement, motivation, and knowledge retention. Maris suggests that these tactile experiences serve as valuable tools for educators

seeking to enhance overall learning outcomes among young learners.

Similarly, Main (2023) corroborates Maris's perspective, emphasizing the significance of hands-on writing tasks in providing students with more meaningful opportunities to interact with the subject matter. Main underscores the importance of integrating hands-on experiences that involve physical manipulation of writing utensils and direct engagement with writing surfaces to foster fine motor skill development and deepen comprehension. Together, Maris and Main advocate for the integration of hands-on writing activities into early childhood education curricula, emphasizing their potential to optimize learning experiences for young students (Maris, 2023 & Main, 2023).

Concurrently, the educational strategy of team teaching offers a collaborative approach to instruction that can be particularly impactful in early childhood settings (Grell & Chapel, 2022). This shared teaching approach involves educators working together to instruct the same group of students on a given subject using unified lesson plans, exercises, and resources (Kays, 2022). Emphasizing effective teamwork and a shared educational goal, team teaching fosters the development of teamwork competencies among educators (Rosenfield et al., 2018).

Asuncion, H. J. et. al. (2024) noted that for early childhood education, incorporating collaborative teaching strategies like team teaching can enrich the learning environment, promote effective teamwork among educators, and ultimately enhance the educational experience for young learners. By combining hands-on writing activities with collaborative teaching approaches, educators can create dynamic and engaging learning environments that cater to the diverse needs of early childhood students.

However, while studies have already explored the use of hands-on learning and participant-team teaching, there needs to be more empirical research on the effectiveness of combined hands-on learning and participant-observer-team teaching in enhancing the basic handwriting skills of daycare center learners, especially in the Philippines.

Failure to attain handwriting competency during the school age years often has far-reaching negative effects on both 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. Poor handwriting may be related to intrinsic factors, which refer to the child's actual handwriting capabilities, or extrinsic factors which are related to environmental or biomechanical components, or both. It is important that handwriting performance be evaluated using a valid, reliable, standardized tool combined with informal classroom observation and teacher consultation.

Studies of handwriting remediation suggest that intervention is effective. There is evidence to indicate 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. (Feder, K. & Majnemer, A. 2007)

Datchuk, S. (2024) noted that research suggests a close link between writing and reading overall, including a strong relationship between the development of early writing and reading skills, such as spelling and word reading (Kim et al., 2024). In spite of these ties, handwriting is rarely mentioned in the national conversation on how to improve the reading performance of elementary students.

Another reason handwriting is often forgotten is because it can be easy to confuse handwriting as more closely associated with drawing than reading. In its most basic form, handwriting occurs when students use a pencil, or any writing utensil (e.g., crayons or marker), to form letters of the alphabet. Similar to drawing, handwriting relies on physical and visual actions, Datchuk (2015) for brief descriptions of the processes. When kindergarteners draw pictures of their families or write the letter "b," they use fine-motor movement to make subtle adjustments to their pencils and visual-motor coordination to adjust lines and shapes based on visual feedback (e.g., staying within the margins of a paper).

What distinguishes drawing from handwriting is knowledge of the alphabet—specifically, skills related to letter identification (e.g., name or sound of each letter) and formation (e.g., appropriate shape, size, and slant of letters). To handwrite letters of the alphabet, students use orthographic and phonologic information or memories of each letter shape, formation, and name (Datchuk & Kubina, 2013). This knowledge needed for proficient handwriting also contributes to proficient reading. For example, when students read or write the letter "b," they draw upon their memorized representation of the letter shape, formation, and name or sound of "b." Because dyslexia, a common reading disability, affects one's ability to connect speech sounds with the symbols that represent them, it is not surprising that students with dyslexia and other reading disabilities often have difficulty with Handwriting (Alamargot et al., 2020)."

Datchuk, S. (2024) noted that interplay between working and long-term memory plays a central role in explaining the benefits of handwriting to overall literacy development (Graham, 2018). Working memory allows for the temporary storage of information for immediate use, such as remembering a sequence of numbers as you dial a phone number, whereas long-term memory stores information relatively permanently. Engaging in writing and reading are cognitively demanding tasks. The numerous skills involved in writing (e.g., text generation of multiple sentences on a topic) and reading (e.g., decoding and interpreting vocabulary) all compete for a limited amount of working memory resources. Put simply, it is hard to juggle all the skills, content, and processes involved in reading and writing at the same time.

One of the ways to make it easier for students to read and write is to develop fluency—accuracy and efficiency—with foundational skills. When skills are fluent, they are stored in long-term memory, thereby freeing up cognitive resources to attend to other aspects of a composition or passage. The shifting of letter knowledge (e.g., letter identification and formation) from working memory to long-term memory is likely one of the key reasons handwriting instruction improves reading. Specifically, handwriting helps facilitate the storage of alphabetic knowledge—shape, formation, name, and sound of letters—that can also be used to learn how to read.

Bonneton-Botté, N. et al. (2023) emphasized that handwriting is a crucial factor in determining academic success and autonomy for all children. Making knowledge accessible to all is a challenge in the context of inclusive education. Given the neurodevelopmental diversity within a classroom of children, ensuring that the handwriting of all pupils progresses is very demanding for education professionals.

The development of tools that can take into account the variability of the profiles and learning abilities of children with handwriting difficulties offers a new potential for the development of specific and adapted remediation strategies. As handwriting has other functions in children, it contributes to the preparation of reading, writing, and spelling skills. Considering the importance of handwriting in childhood, digital learning environments should not be seen as an end point, but as a means to personalize learning paths to ensure success for all as current school methods of remediation cannot be totally individualized.

Methodology

Research Design

The study employed an action research design to evaluate the effectiveness of the Project (S.W.I.M.)—Simple Writing Intervention Materials for improving the kindergarten handwriting skills of Talacdan Elementary School. The main goal of action research is to address local-level problems in practice with the anticipation of finding immediate answers to questions or solutions to those problems (Mertler, 2020).

It is a process that improves education by incorporating change and involving educators working together to improve their practices; it is collaborative and participative, since educators are integral members of the research process; it is practical and relevant, allowing educators direct access to research findings; and it focuses on critical reflection about professional practice.

Respondents

The study covers the forty-five (45) kindergarten learners of Talacdan Elementary School in Barangay Talacdan, Cauayan, Negros Occidental, who were officially enrolled in the school year 2022-2023.

Participants comprised twenty-three (23) males and twenty-two (22) females, with an average age of the learners ranging from 5 to 6 years old, of whom most are from the uphill and far-flung areas. The researcher chose these kindergarten pupils as participants because they are at the elementary level and require attention and assistance, being in their first year of school. Therefore, they were fit for the intervention.

Instrument

Handwriting skills have five (5) criteria: pencil grasp, shape formation, control, letter formation with basic strikes, and letter formation with curves or slanted lines. A rubric was used with the following rating: beginning (1 point), developing (2 points) and consistent (3 points), then, a score for each criterion was added and the sum of test scores was evaluated based on the following: 14-15 point (consistent), 7-13 point (developing) and 1-6 point (beginning). Researchers carefully rated the participants' outputs based on the criteria outlined in the rubrics.

Procedure

The researcher obtained permission from the relevant authorities and sent a letter to the district supervisor requesting approval to conduct the study. After the approval from the district supervisor, a letter was sent to the principal to conduct the study.

Parents' consent was secured before the implementation of the pretest. Parents assisted the researcher in conducting the pretest. Then, the researcher evaluated the pretest results, which showed that all participants needed intervention.

During the implementation phase, Project S.W.I.M. was introduced to the participants as an intervention. It lasted for four (4) weeks, and the researcher conducted formative assessments to evaluate the participants' handwriting skills.

After the implementation of the Project S.W.I.M., the teacher conducted the post-test. After conducting the post-test, the researcher checked the results and performed a careful analysis to ensure an accurate post-test score. The researcher-made rubric in determining the performance level of the participants in their handwriting skill was used.

Ethical Considerations

The researcher observed ethical considerations in implementing the research to protect the confidentiality of participants' data. A parent's consent was secured, including participants' confirmation to be a part of the study.

Results and Discussion

Level of performance of the participants' handwriting skills before the intervention

Table 1. Performance level of kindergarten pupils in handwriting skills during pretest

<i>Handwriting Skills</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Interpretation</i>
Pencil grasp	1.72	0.614	Beginning
Shape formation control	1.26	0.816	Beginning
Control	1.21	0.523	Beginning
Shape formation with basic stroke	1.14	0.737	Beginning
Letter formation with curve and slanted lines	1.15	0.624	Beginning
Pretest mean	6.48	2.71	Beginning

Legend: Individual handwriting skills are interpreted based on the following mean scores: 0–1.79 = beginning, 1.89–2.59 = Developing, 2.69–3.00 = Consistent; overall pretest handwriting skills are interpreted as follows: 1.00–1.69 points = Beginning, 7.00–13.90 points = Developing, 14.00–15.00 points = Consistent.

Table 1 shows the performance level of twenty-five (25) kindergarten pupils in their handwriting, who received a pretest score with a mean 6.48 and a standard deviation of 2.721, which is interpreted as beginning. Based on the rubrics, it was found that the participants demonstrated sufficient handwriting skills in writing different letters and shapes. Still, they showed insufficient skill in forming these shapes and letters properly.

Different handwriting skills such as pencil grasp got a mean of 1.72 and standard deviation 0.614, shape formation control got a mean of 1.26 and standard deviation 0.816, control got a mean of 1.21 and standard deviation 0.523, shape formation with basic stroke got a mean of 1.14 and standard deviation 0.737, and letter formation with curve and slanted lines got a mean of 1.15 and standard deviation 0.624. All handwriting skills of the kindergarten pupils were at the beginning level.

A pretest score result indicating that kindergarten students' handwriting skills are at a beginning level aligns with Santiago, C. (2024), who found that children's basic handwriting skills exhibit a substantial deficit. Conducting the preassessment or pretest in handwriting skills is crucial for kindergarten teachers, as it enables them to assess the kindergarten's handwriting skills. According to Albano (2019), teachers could not decipher what most students write because of their poor penmanship. This need is often overlooked because the curriculum guide does not explicitly focus on learning to write every letter in the standard form; instead, it is integrated into other activities.

Furthermore, a pretest at the beginning level highlighted the importance of conducting an intervention. The assessment of handwriting skills of the participants also embodies the findings of Hartingsveldt (2015), which showed that an early detection of possible problems in the learning process of handwriting is essential for the prevention of handwriting problems at a later age.

The beginning level in the participants' handwriting skills implies a need for intervention, as also noted by Santiago et al. (2024), cited in States et al. (2018), emphasizing that the outcomes of the pretest findings underscore a significant and concerning shortfall in fundamental handwriting abilities within the studied population. The marked deficits in accuracy, consistency, control, independence, and neatness indicate a pervasive issue that demands immediate attention. In the kindergarten level, it is necessary to provide intervention as Martino and Lape (2020) noted that there is a correlation between fine motor and academic skills in reading and math. In addition, literacy skills and early learning are enhanced by developing kindergarten readiness skills through fine motor, grasp, in-hand manipulation, pre-writing, and sensory interventions. Teaching the proper way of writing will develop the handwriting skills of a child, which is an indicator in their readiness.

Pretest results encouraged the researchers to conduct an intervention to improve the beginning-level handwriting skills of kindergarten students.

Level of performance of the participants' handwriting skills after the intervention

Table 2. Level of performance Kindergarten pupils in the Handwriting Post-test

<i>Handwriting Skills</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Interpretation</i>
Pencil grasp	2.80	0.408	Consistent
Shape formation control	2.44	0.507	Developing
Control	2.16	0.554	Developing
Shape formation with basic stroke	2.52	0.510	Developing
Letter formation with curve and slanted lines	2.28	0.614	Developing
Pretest mean	12.20	1.96	Developing

Legend: Individual handwriting skills are interpreted based on the following mean scores: 0–1.79 = beginning, 1.89–2.59 = Developing, 2.69–3.00 = Consistent; overall pretest handwriting skills are interpreted as follows: 1.00–1.69 points = Beginning, 7.00–13.90 points = Developing, 14.00–15.00 points = Consistent.

Table 2 shows the level of performance of twenty-five (25) kindergarten pupils in handwriting, who received a post-test score with a mean of 12.12 and a standard deviation of 0.408, which is interpreted as developing. Based on the rubrics, it was found that there was an increase in the handwriting skills of the participants after the implementation of Simple Writing Intervention Materials in Improving the Kindergarten Handwriting Skills (S.W.I.M).

A handwriting skill on pencil grasp got a mean of 2.80 and a standard deviation of 0.408, which is at a consistent level. Handwriting skills such as shape formation control got a mean of 2.44 and standard deviation 0.507, control got a mean of 2.16 and standard deviation 0.554, shape formation with basic stroke got a mean of 2.52 and standard deviation 0.510, and letter formation with curve and slanted lines got a mean of 2.28 and standard deviation 0.614. All handwriting skills of the kindergarten pupils were at the developing level.

The result implies that participants of the Simple Writing Intervention Materials in Improving the Kindergarten Handwriting Skills (S.W.I.M) had obtained a developing performance in handwriting skills. Several studies, such as those by Memisevic and Hadzic (2013) and Martini Meilanie et al. (2023), as well as Lui et al. (2015), have found that early intervention and family involvement can positively impact students' fine motor development, enabling them to enhance these skills during key growth periods and the development of young children.

After the intervention, participants have developed performance. A result that is supported with the findings of Weber (2024) stating that fine motor and handwriting skills impact a student's life in many ways as their development periods started as early as childhood years, which is why it is essential to ensure they are given opportunities to help increase their hand muscles during preschool, kindergarten, and first grade.

Significant difference on the handwriting skills before and after the project (S.W.I.M)

Table 3. Significant difference on the handwriting skills before and after the project (S.W.I.M)

Handwriting skills		Mean	Std. Deviation	Mean difference	Paired t--test	p-value	Interpretation
Pencil grasp	Pretest	1.72	0.614	-1.08	-10.947	0.00	Highly significant
	Post test	2.80	0.408				
Shape formation	Pretest	1.26	0.816	-1.18	-7.695	0.00	Highly significant
	Post test	2.44	0.507				
Control	Pretest	1.21	0.523	-0.95	-6.549	0.00	Highly significant
	Post test	2.16	0.554				
Letter formation with basic stroke	Pretest	1.14	0.737	-1.38	-7.960	0.00	Highly significant
	Post test	2.52	0.510				
Letter formation with curves/slanted lines	Pretest	1.15	0.624	-1.13	-14.212	0.00	Highly significant
	Post test	2.28	0.614				
Handwriting skills overall mean	Pretest	6.48	2.71	-5.72	-17.647	0.00	Highly significant
	Post test	12.20	1.96				

Table 3 shows that the participants obtained a pretest score with a mean of 6.48 and a post-test score with a mean of 12.20; there was an increase of 5.72 in the mean score. Moreover, it obtained a Paired T-test computed value of -17.64 with a p-value of 0.000, which is interpreted as highly significant.

It implies that an increase of 5.72 in the mean score of handwriting skills is significantly affected by the implementation of Project SWIM. Although the increase in handwriting skills is small in magnitude, it is evident that the intervention significantly improved the handwriting skills of the participants.

In pencil grasp handwriting skills, the pretest mean score was 1.72 (beginning), and the post-test mean score was 2.80 (consistent). The Paired t-test yielded a value of -10.947 with a p-value of 0.00, indicating a highly significant result. A difference of -1.080 in mean score signifies that there was an increase in the performance level of participants' handwriting skills in pencil grasp.

In handwriting skills, the pretest mean score was 1.26 (beginning), and the post-test mean score was 2.44 (developing). The Paired t-test yielded a value of -7.695 with a p-value of 0.00, indicating a highly significant result. A difference of -1.18 in mean score signifies that there was an increase in the performance level of participants' handwriting skills in shape formation control.

In control of handwriting skills, it obtained a pretest mean score of 1.21 (beginning) and a post-test mean score of 2.16 (developing), with a Paired t-test value of -6.549 and a p-value of 0.00, indicating a highly significant result. A difference of -0.95 in mean score signifies that there was an increase in the performance level of participants' handwriting skills in the control group.

In letter formation with basic stroke handwriting skills, the pretest mean score was 1.14 (beginning), and the post-test mean score was 2.52 (consistent). The Paired t-test yielded a value of -7.960 with a p-value of 0.00, indicating a highly significant result. A difference of -1.38 in mean score signifies that there was an increase in the performance level of participants' handwriting skills in pencil grasp.

In letter formation with curves/slanted lines handwriting skills, the pretest mean score was 1.15 (beginning), and the post-test mean score was 2.28 (consistent). The Paired t-test yielded a value of -14.212 with a p-value of 0.00, indicating a highly significant result. A difference of -1.13 in mean score signifies that there was an increase in the performance level of participants' handwriting skills in letter formation with curves/slanted lines.

The significant result implies that the implementation of Project SWIM as an intervention had a significant influence on the increase

in participants' handwriting skills, particularly in terms of pencil grasp, shape formation control, and letter formation with both basic strokes and curves/slanted letters. In the overall handwriting skills of the participants, a significant increase in performance is noticeable, as their handwriting skills improved from the beginning to the developing level. Moreover, researchers are encouraged to increase the time spent on the intervention with the help of the parents.

The study's results underscored the significance of early-stage intervention activities in developing handwriting skills, as noted by Zylstra and Pfeiffer (2016), who found that students who received intervention significantly improved compared to those who did not. Students in the intervention group also demonstrated significantly greater gains in the prereading skills of uppercase letter recognition, lowercase letter recognition, and letter sound recognition. Moreover, a handwriting intervention improved writing legibility and letter recognition in kindergarteners.

On the effectiveness of intervention, Khan et al. (2023) noted that the support of parents, teachers, and the group in incorporating various techniques is crucial, along with handwriting intervention. The role of technology is still emergent and requires more exploration in its role in improving handwriting. On the other hand, it was also noted that more study is needed to evaluate whether this modality also enhances handwriting quality and spelling. Adaptive techniques are also used to improve handwriting. Collaboration with other 2professionals and parents has also shown positive outcomes.

Moreover, Weber (2024) noted that teachers can use a variety of hands-on activities to improve academic learning and fine motor skills simultaneously. A student's fine motor abilities help guide their handwriting skills. Handwriting is an important skill that students need to practice early to help them learn letter formation, spacing, and alignment. By practicing letter formation, students were able to build strong letter knowledge and muscle memory.

Conclusions

Based on the study's results, the participants' handwriting skills during the pretest are at the beginning level in terms of pencil grasp, shape formation control, letter formation with basic strokes, letter formation with curves/slanted, and overall handwriting skills. Following the intervention of project S.W.I.M., handwriting skills in terms of pencil grasp were at a consistent level. In contrast, shape formation control, letter formation with basic strokes, letter formation with curves/slanted, and overall handwriting skills were at a developing level.

There was a highly significant difference between the pretest and post-test scores in participants' handwriting skills. The improvement in their handwriting skills was evident in the results of their post-test after the implementation of the project SWIM. After the intervention, the pencil grasp is at a consistent level, which is also crucial for all handwriting skills. Moreover, constant practice and increasing time spent with parents' support are encouraged to support the intervention.

Learning to write by hand directly leads to learning to read. Handwriting exercises encourage learning in the brain. Students handwrite most homework and assessments; through this, the automaticity, speed, and output of handwriting instruction are supported. Perfecting or improving a skill requires a lot of practice. Constant handwriting practice improves language and meaning understanding while writing by hand, and it aids kids in understanding what they read and write. It was concluded that the Project S.W.I.M. effectively improved the participants' performance in terms of their handwriting skills. Hence, it is an effective tool in helping learners develop and improve their handwriting skills, as evidenced by the increase in handwriting skills.

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