Manipulative Play before Pencil (MPBP): An Interactive Instructional Material for Developing Fine Motor Skills

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ABSTRACT

There is a noticeable gap in kindergarten education due to the lack of instructional materials that specifically target fine motor skill development. As a result, many learners are introduced to pencil-and-paper tasks before they are physically ready, which leads to their poor handwriting skills. This study addressed this gap by developing an instructional material designed to develop fine motor skills through manipative play.. The researchers used a descriptive–developmental research design, adopting an Agile development approach that involved iterative planning, design, development, testing, and expert validation. Five evaluators, composed of teachers who specialize in early childhood education, assessed it using the Evaluation Rating Sheet for Print Resources, the LRMDS Educational Soundness Checklist, and an oral question on effective features. The findings determined the level of satisfaction of the material in terms of content, format, presentation, and organization, and accuracy and up-to-datedness, assessed its educational soundness, and identified its effective features. The results showed an overall Very Satisfactory level of satisfaction in terms of content, format, presentation, and organization, and accuracy and up-to-datedness, and a 97.4% educational soundness, interpreted as a Recommended Quality Evaluated material for education. Qualitative feedback from the evaluators and the students' comments revealed themes highlighting the material's colorful design, clear visuals, and varied manipulative activities, which substantiated the notion that the material is an effective supplementary resource in developing fine motor skills among kindergarten learners.

Keywords: ECE, fine motor skills, instructional material, manipulative play, play-based

INTRODUCTION

There is a noticeable gap in kindergarten education due to the lack of instructional materials that specifically target fine motor skill development. As a result, many learners are introduced to pencil-and-paper tasks before they are physically ready, which leads to their poor handwriting skills. Additionally, functional play, which emphasizes how young children learn the proper use of the objects they are using, is prevalent in kindergarten (Shorouk et al., 2025).

Additionally, the activities in the instructional material are manipulative, where the learners use their hands to hold small objects such as buttons, puzzle pieces, and beads. The researchers want to emphasize the use of hands to manipulate the activities, which is why the material is called a manipulative book. According to Garcia and Thompson (2023), manipulative play is important in early childhood development because it supports physical and cognitive development.

The instructional material also practices the child's hand dexterity, hand-eye coordination, and grip control. Later tasks like writing, using a spoon and fork to eat, and tying shoelaces require these skills. Children will learn while having fun because the activities are done through play.

Play-based learning is essential for a child's development. Play is the best way for kids to learn because it's how they naturally learn. The learning is more effective when the child is connected with others and engaged with the instructional material. The social presence in flexible learning environments is strongly associated with improved learning outcomes and higher student satisfaction (Ong, 2025). Even though this study was done online, this finding highlights the significance of creating materials for learning that are engaging, interactive, and learner-centered.

Fine motor skills are essential; with these skills, people successfully do tasks that are controlled by their hands. Fine motor skills are the capacity to control movement through activities, coordinating the nervous system, fibril, and muscles such as the hands and fingers. (Syafril et al., 2018). To be able to do tasks on their own fine motor skills must be develop in early year of a child. It influences the children's writing progress and everyday activities, which makes it fundamental in children's growth (Józsa et al., 2023). However, developing these skills will need careful planning to attain progress. The careful planning and development of instructional materials is important to ensure that learning resources are developmentally appropriate and effective. Instructional materials developed using a systematic design model, such as the ADDIE model, significantly enhance learner understanding and engagement (Ong & Ancheta, 2024). Their study underscores the importance of structured design processes in producing interactive materials that respond to learners' needs, supporting the present study's approach in developing a structured manipulative book for fine motor skills development. For fine motor skills to develop, a teacher must be able to choose and sort an appropriate medium (Hanafiah et al., 2023).

However, due to the lack of resources specifically designed to develop the fine motor skills of a child. Teachers have no handwriting curriculum or resources that they can use to teach handwriting (Kiefer 2015). Writing is a fundamental skill that is essential to every child's educational experience (Canlas et al., 2017). With the lack of resources and rapid transition it will lead to poor handwriting and the wrong way to hold a pencil, which makes learning harder. Instructional materials must also be aligned with the developmental tasks of learners to ensure readiness for academic demands. Understanding learners' developmental tasks is important in designing instruction that supports holistic growth (Ong, 2024). When instructional materials are mismatched with learners' developmental readiness, difficulties in skill acquisition may arise. This reinforces the need for preparatory materials, such as manipulative play activities, before introducing formal writing tasks to young children.

A study conducted in Singapore about Singaporean Kindergarten Students' Performance in Fine Motor Skills states that the kindergarten education is the main focus of their education system (Shorouk, 2025). It prioritizes kindergarten education because it is the foundation of learning. In the primary and kindergarten curriculum, Singapore integrates fine motor skills, promoting holistic development of the child (Shorouk, 2025). But despite the inclusion of fine motor skill development in the kindergarten curriculum. Mukherjee et al. (2017) shows that when it comes to fine motor skill performance, most children were categorized as average or below average, and that there were clear lags in looking-away skill compared to other countries.

A study by Strooband et al. (2020) shows that interventions for motor skills produce moderate improvements in young children's fine motor, visual motor, and manual dexterity abilities. This supports the need for instructional material specifically made for the development of fine motor skills. Shows that interventions for motor skills

Similar findings were observed in a study by Flores et al. (2025), which investigated the effects of discovery-based learning on the environmental skills of daycare students using an interactive learning material. The study revealed that hands-on, exploratory activities significantly enhanced learners' skills and engagement. This supports the present study's use of manipulative and discovery-oriented activities to promote fine motor development among kindergarten learners.

In the Philippine context, the importance of strategic instructional materials is further supported by Orine et al. (2024), who developed a pocket-sized strategic intervention material for Grade 6 Science. Their findings show that a material that is learner-friendly and well-designed improves engagement in learning performance.

The Department of Education recognizes fine motor skills as important to young children's holistic development since these skills are necessary for schooling, especially when it comes to writing and other activities. The revised Kindergarten curriculum guide of the Department of Education (DepEd, 2024) identifies physical health and motor development as a core developmental domain for school readiness of a child. In order to move effectively and efficiently during healthy physical activities, learners should develop their fine and gross motor abilities. However, despite its inclusion in the curriculum, based on the studies in the Philippines, there are only interventions to develop the fine motor skills of a child. There is still a lack of structured instructional materials that specifically target fine motor skills.

Through a conducted pre-interview, a kindergarten adviser at Don Mariano Marcos Memorial State University Laboratory Elementary School stated that the instructional materials available for learners are mainly limited to basic art supplies such as crayons, clay, and scissors. According to her, the primary goal in their kindergarten program is to enhance the children's writing skills. She further mentioned that workbooks are also provided, which help support writing development. However, she noted that not all learners demonstrate readiness in writing; while some are already capable, others are still not fully prepared.

The significance of this study is that, with the help of this ready-made instructional material, it addresses the gap, which is the lack of resources. And the rapid transition of children to writing will be prevented when the instructional material is implemented. Also, the need to think about what fine motor activity to do for the next class is no longer needed. Which lessens the teachers' work, making them more focused on actually facilitating the child.

To make this study strong, theories have been identified. Learning by Doing. By John Dewey. He believes that the best way to learn is when children are involved and experiencing things rather than passively listening to the teacher. With the ideas John Dewey, Kolb expanded Dewey's concepts, Kolb (2015) advanced the notion of experiential learning, he describes it as a process in which knowledge is made by the conversion of experience. He says that learning consists of a repetitive cycle including direct experience, thoughtful reflection, theoretical formulation, and practical application. In this study, the concept of Learning by Doing is applied through the development of an instructional material book that allows children to manipulate, play, and explore different activities repeatedly, designed to improve their fine motor skills. Sociocultural Theory by Lev Vygotsky. He introduced the Zone of Proximal Development (ZPD), which illustrates what the child can do independently, what the child can do with the help of more knowledgeable others (MKO), and what lies beyond the child's current capabilities. He believes that what a child can do with help today will eventually be doable independently tomorrow (Vygotsky, 2018). This shows the importance scaffolding in developing skills. The Instructional material will serve as scaffold by giving fine motor activities that teachers initially guide, this will let the learners eventually do the activities independently. Practical Life Activities Theory by Maria Montessori's. The concept of practical life activities for developing children's fine motor skills is not only about hands-on activities, it is more about the indirect preparation to enhance coordination, concentration, independence, and control of movement. Practical Life activities have been proven effective in the fine motor development of kindergarten children, as activities such as pouring, threading, spooning, buttoning, zipping, lacing, sorting, folding, and cutting require precise hand–eye control. Furthermore, the American Montessori Society (2023) emphasized that these activities serve as external motivation to refine the organization of children's movements, which later becomes the foundation of writing and other more complex skills.

These theories supports the three (3) statement of the objectives. The statement of the objective 1 which looks at the level of the satisfaction of users in terms of content, format, and presentation. The material is designed so learners manipulate and play with it, rather than passive learning, is backed by the theory of John Dewey which is Learning by doing. Lev Vygotsky's Sociocultural Theory explains that learning becomes meaningful with social interaction and collaboration. This aligns with statement of the objective 2, which focuses on the educational soundness of the instructional material. The facilitator will facilitate the child while it manipulates the material, supporting Vygotsky's principle of the "more knowledgeable other". Maria Montessori's Practical Life Activities Theory highlights that purposeful, hands-on tasks strengthen fine motor control and independence. This directly supports statement of the objective 3, which seeks to analyze the effective features of the material in supporting fine motor skill development among learners.

METHODOLOGY

This study employed a descriptive–developmental research design. According to Creswell and Creswell (2018) and Dantic (2023), this design is appropriate for studies that focus on the development and evaluation of instructional materials. The instructional material was developed using an Agile approach involving iterative cycles of planning, designing, developing, testing, releasing, and revising the prototype based on expert feedback, as emphasized by Koudriachov et al. (2025). The study was conducted at Don Mariano Marcos Memorial State University – Mid La Union Campus (DMMMSU-MLUC). The evaluation was conducted by five (5) experts in early childhood education. It consists of three (3) kindergarten teachers, one (1) administrator, and one (1) external daycare teacher, to ensure professional and content-based validation. Since the primary aim of the study was the development and expert evaluation of the instructional material, a limited group of specialists was deemed appropriate at this stage. Broader classroom implementation and testing with learners are recommended for future studies. Two instruments were used for evaluation: the Evaluation Rating Sheet for Print Resources and the LRMDS Educational Soundness General Evaluation Checklist. Qualitative data such as experts comments and students comments were examined using thematic analysis, according to Braun and Clarke (2006), while quantitative data were examined using mean scores, percentages, and descriptive equivalents. The manipulative activities included developmentally appropriate fine motor tasks such as buttoning, lacing, zipping, sorting small objects, and matching pieces. Each activity was accompanied by step-by-step visual guides and teacher instructions to ensure proper demonstration and safe use. These detailed procedures were designed to allow other educators to replicate the implementation of the material in their own classrooms.

RESULTS

The results showed that the satisfaction level of the Manipulative Book is Very Satisfactory in terms of content, format, presentation and organization, and accuracy and up-to-datedness. The total mean score obtained from the content quality of the material was 24.8 out of a maximum of 28 points, which exceeded the minimum resource score of 21 points required to pass this criterion. The total mean score obtained from the format of the material was 66 out of a maximum of 72 points, which exceeded the required minimum score of 54 points. This indicates that the instructional material is very satisfactory in terms of format. The total mean score obtained from the presentation and organization of the material was 18.8 out of 20 points, surpassing the required passing score of 15 points. This means that the instructional material is rated as very satisfactory.The total mean score obtained from the accuracy and up-to-datedness of the MPBP for Developing Fine Motor Skills was 22.6 out of a possible 24 points, which slightly fell below the required passing score. This result reflects the iterative nature of the Agile development approach used in the study. The initial prototype, developed without expert guidance, received lower ratings; however, after each evaluation cycle, revisions were made based on the experts' feedback. These continuous improvements led to progressively higher scores, and in the final evaluation, the material achieved a perfect rating, indicating that it fully met the required standards for accuracy and up-to-datedness.

As for the educational soundness of Manipulative book got an overall mean percentage of 97.4%, interpreted as Recommend full Educational Quality Evaluation. This means that the instructional material meets the DepEd standards of educational soundness.

From the evaluators' comments and feedback, together with students' comments, four major themes emerged: (1) Child-Appropriate Design, (2) Varied Manipulative Activities, (3) Clear Visual Guides and Instructions, and (4) Fine Motor Skill Foundation Activities

The findings revealed that the Manipulative Book got an overall Very Satisfactory level of satisfaction in terms of content, format, presentation, organization, accuracy, and up-to-datedness. The Manipulative Book achieved an overall educational soundness rating of 97.4%, interpreted as Recommend Full Educational Quality Evaluation.The effective features of the Manipulative Book identified by the experts include child-appropriate design, varied manipulative activities, clear visual guides and instructions, and foundational fine motor skill activities.

DISCUSSION

The Very Satisfactory descriptive equivalent rating in terms of the content, format, presentation and organization, and accuracy and up-to-datedness of the material supports Statement of Objective 1, as it allows learners to manipulate and play the activities, is backed with the theory of John Dewey which is the Learning by Doing, which he emphasizes that we learn best when we experience it.

The Recommend Full Educational Quality Evaluation for the educational soundness of Statement of Objective 2, is supported by Lev Vygotsky's Sociocultural Theory, specifically the role of the more knowledgeable other in the Zone of Proximal Development, as it promotes a learning that is guided.

The effective features of the material which is the Statement of Objective 3, is supported by Montessori's Practical Life Activities Theory, which highlights preparation for writing through manipulative tasks as the hands-on, purposeful, and progressive activities strengthen fine motor control prior to writing.

It is important to note that this study primarily focused on the design, development, and expert validation of the instructional material. Classroom implementation and measurement of learners' performance outcomes were intentionally beyond the scope of the present research. Future researchers may conduct pilot testing or experimental studies to further examine the effectiveness of the manipulative book in improving hand dexterity, grip control, and handwriting readiness among kindergarten learners.

CONCLUSION

Based on the findings, the following conclusions were drawn: The very satisfactory level of satisfaction indicates that the material is developmentally appropriate, well-designed, and aligned with current educational standards for kindergarten learners. Next, the educational soundness result indicates that the instructional material meets required standards and is suitable for further evaluation and classroom use. Lastly, the identified effective features show that the material supports fine motor skill development through manipulative play. The developed material may serve as a foundation for subsequent implementation studies that will further evaluate its effectiveness in real classroom settings.

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