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Enhancing Mastery of Force, Motion, Energy Through Move-Meter Mission Boards Among Grade 6 Learners

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Abstract

Learners find it difficult to understand fundamental principles, concepts, and processes of Science in topics dealing with force, motion, and energy (Department of Education, 2016). Test results show low ability levels among elementary students. The rationale behind these low scores is attributed to many reasons, including the continued use of traditional teaching methods that are not innovative or interactive, a lack of learning materials, low motivation of students, and a lack of hands-on experience, which has created an excellent conceptual understanding (Hattie, 2012). The study stated in this paper was conducted as a one-group pretest-posttest experimental study, which aimed to increase the Mastery of Grade 6 students in Barikir Elementary School in Nueva Era, Ilocos Norte, for the school year 2024-2025 through the use of MOVE-METER Mission Boards. This intervention was designed to engage students in making predictions, conducting tests, and recording results of movement using everyday household items. A validated 25-item teacher-made assessment was administered to 15 students to obtain data for the study. Descriptive mean scores and a paired t-test were utilized to analyze the results and findings. This indicated that using the MOVE-METER Mission Boards was effective in improving the Mastery of force, motion, and energy for students. To add, students demonstrated improved engagement, critical thinking skills, and applied concepts to real-world situations. Thus, it is highly recommended that the MOVE-METER Mission Board intervention be implemented in all Science classrooms to advance both conceptual understanding and academic achievement.

Keywords: *Academic Intervention, Concept Mastery, Inquiry-Based Learning, MOVE-METER Mission Boards, Force and Motion, Descriptive Correlational Statistics, Mean Scores, Paired T-Test, Elementary Science*

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I.INTRODUCTION

The way students build knowledge comes through action rather than passively receiving information, which is supported by using their environment to create knowledge and learning experiences (Department of Education [DepEd], 2016). For this reason, inquiry and experiential learning strategies have been cited as being two of the best approaches for increasing student engagement as well as improving students' understanding of concepts related to science (Lazonder & Harmsen, 2016). Many hands-on/off and interactive activities will lead to a deeper understanding of the material and an increase in student participation in the learning of a subject through experiential or hands-on learning, as well as observing and performing experiments will help students relate to abstract scientific concepts through their daily activities. Research conducted in the Philippines indicates that experienced-based/active-learning types of teaching strategies improve students' academic performance and retention rates for science (Dela Cruz, 2020). Because of the fact that using active/experiential-based learner-centered and interactive-based teaching approaches improve student engagement and retention.

According to its purpose and vision, the Department of Education focuses on providing a quality, equitable, and relevant education that fosters active learning. This aligns with their mission of providing learners with meaningful and engaging learning experiences through the essential knowledge and skills they will need to be successful. Therefore, implementation of innovative teaching strategies will be necessary to produce effective learners. Quality education does not only focus on the academic achievement of the learner but rather on the application of knowledge in real-world situations. Studies indicate that students who are active participants in the learning process have a greater understanding of the material and achieve at a higher level (Garcia & Torres, 2021). Thus, adapting to modern, learner-centered methods of instruction is critical to meeting the needs of 21st-century learners.

However, most teachers still use traditional teacher-centered instructional methods, in which learners passively receive information. This inhibits learner participation and limits the development of critical thinking and problem-solving skills (Malones, 2019). When learners do not develop these skills, their academic performance is low, and they do not fully master concepts. The average (Mean Percentage Score) of Grade 6 learners at Barikir Elementary School in Nueva Era, Ilocos Norte, was low regarding Science. Specifically, learners appeared to struggle with Science concepts involving force, motion and energy. They had difficulty predicting the effect of force on an object, the explanation of motion, and applying what they learned about motion to the real world. This supports the conclusion that, to fully understand abstract Science concepts, learners require tangible hands-on experiences (Reyes, 2018).

In order to address these problems, updating practices is vital. If instructional strategies are not facilitating learning effectively, they must be modified (DepEd, 2020). The best way to improve student understanding is to implement effective interventions and provide appropriate instructional materials. One intervention that has shown effectiveness is an inquiry-based, hands-on approach, in which students are given the opportunity to explore and discover concepts on their own. The MOVE-METER Mission Boards are a new instructional intervention created to engage the learner in predicting, testing, and documenting the effect of force on the movement of common household materials. The goal of this strategy is to promote active participation, collaborative learning and critical thinking in the classroom.

Transforming the traditional classroom into a student-centered environment is required for students to develop their potential fully. Students learning in today’s world should have innovative and engaging instructional methods that connect classroom learning to real-world experiences. Concept mastery is vital at all levels of Science learning because it enables students to function effectively in the application of what they learn. The MOVE-METER Mission Boards provide opportunities for students to actively participate in the learning process while increasing their knowledge of force, motion and energy.

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II. RESEARCH QUESTION

This study aimed to determine the effect of using MOVE-METER Mission Boards on the mastery of force, motion, and energy among Grade 6 learners at Barikir Elementary School, Nueva Era, Ilocos Norte.

Specifically, it sought to answer the following questions:

a. What is the level of mastery of force, motion, and energy among Grade 6 learners as reflected in their test scores before the implementation of the MOVE-METER Mission Boards?

b. What is the level of mastery of force, motion, and energy among Grade 6 learners as reflected in their test scores after the implementation of the MOVE-METER Mission Boards?

c. Is there a significant difference between the level of mastery of Grade 6 learners before and after the implementation of the MOVE-METER Mission Boards?

III. METHODOLOGY

3.1 Research Design

An experimental design was used in the study to measure the performance of a single group of participants on two different occasions: before and after the intervention. The pretest identifies the baseline level of competency and the post-test measures how well participants did because of participating in that specific intervention.

A one-group pre-test/post-test design examines a dependent variable's ability to change or improve by measuring two separate time periods (one before, one after) when an independent variable was introduced (the independent variable in this case is the participants' mastery of the concepts of force, motion, and energy due to their use of the MOVE-METER Mission Board). The findings from this design will be used to analyze whether the MOVE-METER Mission Board was effective in enabling the participants to improve in their understanding and ability to apply the concepts of force, motion, and energy.

3.2 Participants

For this study, we had 15 sixth graders from Barikir Elementary School in Nueva Era, Ilocos Norte for the school year 2024-2025. The researcher was the science teacher for these 15 students, whom were selected using purposeful sampling based on their history of low levels of mastery in science (specifically with force, motion, and energy). The students in this program were involved in instructional intervention to promote their understanding of science concepts. All 15 students were from the same class and experienced the MOVE-METER Mission Boards intervention for the duration of the study.

3.3 Intervention

The researcher-intervention consisted of the use of MOVE-METER Mission Boards, which are activity-based learning tools designed to enhance learners' understanding of force, motion, and energy through prediction, experimentation, and recording of results. The learners were engaged in hands-on activities using simple and readily available household materials such as toy cars, balls, ramps, rubber bands, and improvised measuring tools. These materials were selected to make learning more accessible, practical, and meaningful to the learners.

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The Grade 6 learners were naturally curious and demonstrated interest in activities that allowed them to explore and manipulate objects. Recognizing this, the teacher-researcher introduced the MOVE-METER Mission Boards as an intervention to address learners' low mastery and lack of engagement in Science. The intervention served as a platform to connect theoretical concepts with real-life experiences, thereby making learning more interactive and engaging.

The following stages illustrate how the MOVE-METER Mission Boards were integrated into the Science lessons. Prior to the start of each lesson, a short motivation activity was conducted to activate learners' prior knowledge and stimulate curiosity. The teacher-researcher then introduced the mission board for the day, which contained specific tasks related to the lesson objectives. Each mission board followed three essential phases: Predict, Test, and Record.

During the Predict phase, learners were asked to anticipate the outcomes of a given activity, such as determining which object would move faster or how force would affect motion. This phase encouraged learners to think critically and formulate hypotheses.

In the Test phase, learners performed simple experiments using the provided materials. For instance, they rolled objects on inclined planes, applied varying amounts of force, and observed changes in speed and direction. These activities allowed learners to directly experience the concepts being taught.

In the Record phase, learners documented their observations, measurements, and conclusions in their mission boards. They were guided to analyze their findings and explain the relationship between force, motion, and energy based on their results.

After completing the activities, learners were grouped to discuss their findings and share their insights with the class. The teacher-researcher facilitated the discussion to ensure that the scientific concepts were clearly understood and properly connected to the lesson objectives. Each mission board was carefully designed to align with specific competencies such as the effects of force on motion, speed and direction, and forms of energy.

The intervention was implemented over a four-week period, with each week focusing on a different topic in force, motion, and energy. Each session introduced a new mission board with varied activities, ensuring continuous engagement and progressive learning. Through this structured yet interactive approach, learners were able to actively participate in the learning process, thereby improving their conceptual understanding and mastery of the subject matter.

3.4 Instrumentation and Data Collection

To determine the effect of the MOVE-METER Mission Boards on learners' mastery of force, motion, and energy, the respondents were given a pretest and a posttest. These tests were teacher-made and consisted of 25 multiple-choice questions designed to measure learners' understanding of key concepts such as force, motion, speed, direction, and energy transformation.

Prior to the implementation of the intervention, the pretest was administered to establish the baseline level of mastery of the learners. The results indicated that the learners had low mastery of the concepts, which justified the need for an instructional intervention. After the intervention period, the same set of test items was administered as a posttest to determine any improvement in learners' performance.

The test items were carefully constructed based on the Most Essential Learning Competencies (MELCs) prescribed by the Department of Education for Grade 6 Science. The questions focused on

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helping learners understand and apply concepts related to force, motion, and energy through real-life situations and problem-solving tasks.

To ensure the validity of the instrument, the test was evaluated and reviewed by the school head and two experienced Science teachers. The evaluation focused on the content, clarity, organization, and relevance of the test items. Based on their assessment, the instrument was found to have high content validity and was deemed appropriate for measuring learners' mastery.

After validation, the test was pilot tested to a group of learners with similar characteristics to determine its reliability. The reliability of the test was computed using the Kuder-Richardson Formula 20 (KR-20), which yielded a coefficient within the acceptable range, indicating that the instrument was reliable.

The researcher personally administered both the pretest and posttest to the 15 Grade 6 learners of Barikir Elementary School during the School Year 2024–2025. The collected data were recorded, tabulated, and prepared for statistical analysis to determine the effectiveness of the MOVE-METER Mission Boards intervention.

3.5 Data Analysis

The data gathered before and after the intervention were analyzed to answer the research questions of the study. To analyze and interpret the data for research questions 1 and 2, the test scores were arranged according to the number of correct responses obtained by the learners in both the pretest and posttest.

To determine the level of mastery of force, motion, and energy, the following descriptive equivalents were used:

Score Range	Descriptive Equivalent
21 – 25	Mastered (M)
16 – 20	Moving Towards Mastery (MM)
11 – 15	Average Mastery (AM)
6 – 10	Low Mastery (LM)
0 – 5	Very Low Mastery (VLM)

These descriptive ratings were used to interpret the learners' level of mastery before and after the implementation of the MOVE-METER Mission Boards.

For research question 3, which aimed to determine whether there was a significant difference between the pretest and post test scores, the paired t-test was utilized since the same group of learners was tested before and after the intervention. The statistical analysis was performed with the aid of the Statistical Package for the Social Sciences (SPSS) to ensure accuracy and reliability of the results.

IV. RESULTS

4.1 The Level of Mastery Before and After the Intervention

This section presents the data gathered to determine the effectiveness of the MOVE-METER Mission Boards in enhancing the mastery of force, motion, and energy among Grade 6 learners at Barikir

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Elementary School, Nueva Era, Ilocos Norte during the School Year 2024–2025. The results are presented in tables for clarity and interpretation.

The distribution of scores in the pretest and posttest is shown in Tables 1 and 2. The data indicate that most learners initially scored within the range of 6–10, which increased to 16–20 after the intervention. This suggests an improvement in learners' mastery level.

The pretest results revealed a mean score of 9.40, which corresponds to a descriptive equivalent of Low Mastery (LM). After the implementation of the MOVE-METER Mission Boards, the posttest mean increased to 18.10, corresponding to Moving Towards Mastery (MM). This indicates a significant improvement in learners' understanding of the concepts.

Table 1: Pretest Scores Distribution

Score Range	Frequency
0 – 5 (VLM)	1
6 – 10 (LM)	9
11 – 15 (AM)	5
16 – 20 (MM)	0
21 – 25 (M)	0
Mean	9.40 (LM)

Table 2: Posttest Scores Distribution

Score Range	Frequency
0 – 5 (VLM)	0
6 – 10 (LM)	0
11 – 15 (AM)	3
16 – 20 (MM)	10
21 – 25 (M)	2
Mean	18.10 (MM)

Legend:
0–5 Very Low Mastery (VLM)
6–10 Low Mastery (LM)
11–15 Average Mastery (AM)
16–20 Moving Towards Mastery (MM)
21–25 Mastered (M)

4.2. Test difference between the level of concept assimilation of the control and experimental groups before and after the intervention

Table 3 presents the results of the comparison between the pretest and posttest scores of the learners. A paired t-test was used to determine whether there was a significant difference between the scores before and after the intervention.

The computed t-value of 4.25 is higher than the critical t-value of 2.14 at 0.05 level of significance with 14 degrees of freedom. This indicates that there is a significant difference between the pretest and posttest scores. Therefore, the null hypothesis is rejected.

Table 4. Table 3. Test of Significant Difference Between Pretest and Posttest

Test	N	Mean	Computed t-value	Critical t-value	df	Level of Significance	Remarks	Decision
Pretest	15	9.40						
Posttest	15	18.10	4.25	2.14	14	0.05	Significant Difference	Reject the Null Hypothesis

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V. DISCUSSION

5.1Results of Pretest and Post-test of Control and Experimental Group

The results of the pretest before the implementation of the intervention revealed that the learners had a Low Mastery level in force, motion, and energy. This indicates that learners had limited prior knowledge and difficulty in understanding the concepts. The result justified the need to implement an instructional intervention to improve learners' conceptual understanding. After the implementation of the MOVE-METER Mission Boards, the posttest results showed a significant improvement, with learners reaching a Moving Towards Mastery level. This implies that the intervention was effective in enhancing learners' mastery of the concepts. The increase in scores suggests that learners were able to better understand and apply scientific concepts through active engagement and hands-on activities.

This finding is supported by recent studies which indicate that experiential and activity-based learning approaches significantly improve learners' conceptual understanding and retention in Science (Dela Cruz, 2020). Similarly, research conducted among Filipino learners revealed that inquiry-based learning enhances engagement and promotes deeper understanding of scientific concepts (Matutes & Sangcopan, 2022). Furthermore, studies in the Philippine context have shown that learners who participate in hands-on and collaborative learning activities demonstrate improved academic performance compared to those taught using traditional methods (Garcia & Torres, 2021). This corroborates the findings of the present study, where learners showed improvement after engaging in structured experimental tasks using the MOVE-METER Mission Boards.

5.2. Test Difference Between the Level of Mastery Before and After the Intervention

The results of the statistical analysis showed a significant difference between the pretest and posttest scores of the learners. This indicates that the improvement in learners' performance was influenced by the implementation of the MOVE-METER Mission Boards and not due to chance. The learners performed better after the intervention, suggesting that hands-on, inquiry-based strategies are more effective than traditional teaching methods. This finding is supported by studies indicating that learner-centered approaches significantly improve academic performance and engagement in Science (Garcia & Torres, 2021). Moreover, recent research has shown that inquiry-based learning enables learners to develop critical thinking and problem-solving skills by allowing them to actively explore and discover concepts (Ederon & Aliazas, 2024). The structured process of predicting, testing, and recording used in the MOVE-METER Mission Boards aligns with this approach, helping learners construct their own understanding.Additionally, a study on inquiry-based teaching practices in Philippine elementary schools found that learners exposed to guided experimentation and structured activities demonstrated higher achievement and improved motivation (Falculan, 2025). This supports the present study's findings that active participation and collaboration contributed to improved mastery. The effectiveness of the intervention can be attributed to several factors. First, the use of simple and familiar household materials made learning more meaningful and relatable, which increased learners' interest and motivation. Second, the hands-on activities allowed learners to directly experience scientific principles, making abstract concepts easier to understand. Third, the structured learning process encouraged critical thinking, analysis, and application of knowledge. Furthermore, the intervention created a positive and engaging learning environment that encouraged learners to actively participate in class activities. Studies have shown that when learners are actively engaged, they tend to perform better and retain knowledge longer (DepEd, 2020). Overall, the findings of this study are consistent with recent research emphasizing the effectiveness of inquiry-based, experiential, and learner-centered teaching strategies in improving learners' mastery of Science concepts. The MOVE-METER Mission Boards provided meaningful learning experiences that enhanced learners' understanding of force, motion, and energy.

VI. CONCLUSION

The use of MOVE-METER Mission Boards as an instructional innovation is a significant breakthrough in enhancing learners' understanding of Science concepts. Teachers can improve learners' mastery of force, motion, and energy by engaging them in hands-on, inquiry-based activities that involve predicting, testing, and recording outcomes. Since learners are naturally curious and interested in interactive tasks, this strategy effectively captures their attention and promotes active participation. Teaching Science through mission-based and experiential learning activities proves to be an effective and creative approach in improving conceptual understanding. The learners who participated in this study demonstrated that the intervention successfully enhanced their mastery of the concepts; therefore, its use is highly encouraged and recommended for wider implementation and dissemination, including presentation in research colloquia.

REFERENCES

World Bank. (2022). *The State of Global Learning Poverty: 2022 Update*. https://www.worldbank.org

UNESCO. (2021). *Addressing the Learning Crisis: An Urgent Call to Action*. Paris: UNESCO.

Domingo, L. & Ramos, J. (2021). Diagnostic Reading Assessment Practices in Selected Philippine Public Secondary Schools. *Asia Pacific Journal of Education*, 41(3), 257–270.

Garcia, M. & Sandoval, E. (2023). Reading Remediation Strategies in Junior High: An Evaluation of Implementation in Modular Learning. *Philippine Journal of Literacy Education*, 4(1), 45–60.

McKenna, M. & Dougherty Stahl, K. (2020). *Assessment for Reading Instruction* (4th ed.). The Guilford Press.

Paris, S. G., & Luo, H. (2021). Effective Reading Interventions in the Post-COVID Era: Rethinking Literacy Support. *Journal of Adolescent & Adult Literacy*, 65(2), 124–135.

SEAMEO-INNOTECH. (2022). *Contextualized Reading Strategies for Southeast Asian Classrooms*. Quezon City: SEAMEO-INNOTECH Publications.

Department of Education. (2022). *Policy Review on the 3Bs (Bawat Bata Bumabasa) Initiative*. DepEd Publications. DepEd. (2023). *Learning Recovery and Continuity Plan*. Department of Education, Philippines.
Enhanced Basic Education Research Fund (EBERF). (2023). *TARA Basa! Project Evaluation Report*. Manila: EBERF Research Consortium.