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Effectiveness of 5-Minute Rule Review and Drills in Improving the Performance of Grade 7 Learners in Integer Operations

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Abstract: ***Advancing the quality of mathematics teaching and learning remains a key challenge for educators. One key factor is that many students view mathematics as the challenging subject, which can result in decreased confidence and engagement, ultimately hindering their ability to learn effectively. Integer operations pose a significant challenge for learners, primarily due to a lack of mastery of the underlying rules and insufficient foundational knowledge in basic integer operations. As a result, learners may need multiple opportunities to develop these skills, and one effective approach to achieve this is through the 5-Minute Rule Review and Drill. This action research aimed to test the effectiveness of 5-Minute Rule Review and Drill in improving the performance of grade 7 learners in integer operation. The participants consisted of two sections from Santol Vocational High School enrolled in the 2024–2025 academic year. This study used a quasi-experimental two-group design, and data were gathered using a 30-item problem-solving skill test from Mathematics DepEd reference material. Data were analyzed statistically using means, percentages, and t-tests. The study investigated the performance levels of participants in the control and experimental groups in the pretest and posttest, examining whether there were significant differences in performance within the experimental group and between the control and experimental groups in the posttest. The control group demonstrated satisfactory performance in both pretest and post test scores, while the experimental group showed fairly satisfactory pretest scores but achieved very satisfactory post test results. There was significant difference after the intervention in the experimental group's pretest and posttest. The findings led to the conclusion that the use of 5-Minute Rule Review Drill is effective in enhancing the performance of grade 7 learners especially along operation of integers. Thus, it is recommended that mathematics teachers may use the 5-Minute Rule Review Drill in teaching operations of integer.***

Keywords: ***5-Minute Rule Review and Drill, Integer Operations, Problem-Solving Skill Test, Performance Levels, Quasi-Experimental Two-Group Design, T-test***

I. INTRODUCTION

Mathematics has a vital role in everyday life, with its influence going far beyond the classroomto promote critical skills like thinking critically, problem-solving, and logical reasoning.One of the basic skills students need to learn is basic integer operations since this will serve as afoundation of a proper mathematical base. The majority of students, however, encounter a lot ofdifficulty when it comes to executing these very basicoperations. These challenges tend to stem from carelessness and a lack of basicknowledge, especially in adding, subtracting, multiplying, and dividing whole numbers(Khalid & Embong, 2019).

In addition, Hanifa et al. (2024) state that learners have misconceptions regarding integers and operations thereof, particularly mixed operations. Their analysis of data identifies that there are students who perceive numbers as mere ritual symbols in mathematics. Their abstract knowledge poses big hurdles, as such students find it difficult to relate numerical concepts to real representations when engaged in discussions.

Moreover, Rosa et al. (2023) note that learners often make procedural mistakes in addition and subtraction of integers as well as interpretation mistakes in multiplication and division. Most students articulate a feeling of inadequacy in their knowledge concerning the addition and subtraction of positive integers after study, prompting them to feel their knowledge is not good enough for arriving at correct results. Furthermore, Santiago and Bernardo (2019) emphasize that Filipino students, especially Grade 7 students, have difficulty with integer operations because they lack proper foundation knowledge. They note in their study that short, targeted drills can effectively close gaps in knowledge and improve computational fluency, which is essential in solving more complex math problems in higher grade levels.

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In order to solve these challenges, teachers need to innovate or improvise their pedagogy by integrating methods like the 5-Minute Rule of review and drilling to improve student performance, interest, and comprehension of mathematics.

In global perspective, Krishnan (2020) highlights the importance of regular, short-duration reviews and drills to reinforce students' learning and recall of mathematical ideas. In particular, the application of 5-Minute Rule reviews—where students undergo short but concentrated practice sessions—has been proven to enhance fluency in basic operations, which encompass integer addition, subtraction, multiplication, and division.

In the Philippines, the Department of Education (DepEd) actively promotes innovative strategies to improve mathematics instruction, including the use of drills and reviews. A study by Villaverde (2018) underscores the importance of incorporating short, regular drills in teaching integer operations to Grade 7 learners. Villaverde's research demonstrates that students who participate in daily 5-minute drills perform significantly better in post-tests than those who do not receive this intervention. This method not only reduces student anxiety but also boosts confidence in handling integer problems, ultimately fostering better academic performance.

In the Philippines, the Department of Education (DepEd) encourages innovative approaches to enhance mathematics teaching, such as the application of drills and reviews. A study by Villaverde (2018) points to the need for the use of short, frequent drills in teaching integer operations among Grade 7 students. Villaverde's study shows that students who undergo daily 5-minute drills have significantly better post-test performances compared to those who are not given such an intervention. This technique not only alleviates anxiety among students but also increases confidence in dealing with integer problems, finally leading to improved academic performance.

In Region 1, efforts to improve mathematics performance have picked up steam in the last few years. A study done by De Guzman et al. (2021) in Pangasinan underscores the value of regular, time-limited review sessions in enhancing Grade 7 students' mastery of integer operations. The study discovers that students who undergo daily 5-minute drill exercises have a 15% increase in overall performance over students who receive conventional teaching methods. Furthermore, the research places emphasis on contextualizing issues to render them more applicable to students' everyday life.

In Ilocos Sur, the Mathematics Division promotes instructional methods that stress repetition and drills to improve students' fundamental mathematics.A local study conducted by Valdez and Santiago (2022) in Vigan City explores the use of short, repetitive drills to improve students' mastery of integer operations. The findings reveal that Grade 7 learners who receive 5-minute drills at the beginning of each math class outperform their peers in quarterly exams. These results support the growing consensus that drills, particularly when combined with immediate feedback, significantly contribute to better mathematical understanding and performance.

Consequently, during an informal interview conducted in October 2024 with Mathematics teachers, the researchers discovered that their students are not performing well in basic operations with integers. While some students demonstrate average performance, only a few excel. Additionally, based on the researchers' observations as math teachers, many learners frequently forget the rules for solving integer problems, leading to incorrect solutions when faced with more complex mathematical tasks. As a result, these students experience significant difficulties with integer operations.

These challenges, combined with the desire to identify effective strategies for enhancing student performance, prompted the researchers to investigate the effectiveness of the 5-Minute Rule Review and Drills in improving the performance of Grade 7 learners in integer operations.

This studywas conducted to determine the effect of 5-Minute Rule Review and Drills (5-MRRD) in teaching operations of integer to Grade 7 student at Santol Vocational High School.Specifically, it seeks to answer the following:

1) What is the level of performance of the participants in the control and experimental groups in the pretest and posttest?
2) Is there a significant difference in the level of performance of the participants in the pretest and posttest in the experimental group?
3) Is there a significant difference in the level of performance of the participants in the posttest of the control group compared to the experimental group?

II. METHODOLOGY

A. Research Design

This study made used of quasi-experimental design using a two-group approach to determine the effectiveness of 5-minute rule review drill in improving the performance of grade 7 learners in integer operation. Two classes at the same school serves as the participants. One group served as the control group, while the other group acted as experimental group.

The experimental group receives the intervention, whereas the control group receives traditional instruction (Cranmer, 2022). Pretest was administered before the experimental group undergone from intervention. after the intervention, posttest was administered both control and experimental group.

B. Participants

The participants of this study were students from Santol Vocational High School during the school year 2024-2025. The study includes two sections of grade 7 learners with equal number of learners: 7 Emerald (36 learners) served as the experimental group, while 7 – Amethyst (36 learners) acted as the control group.

C. Research Instrument

To collect the necessary data to complete this study. 30-item test was the main tool to determine the level of performance in integer operations. The test was taken from the textbooks based on the curriculum guide and MELCS in Grade 7 prescribed by the Department of Education

D. Data Gathering Procedure

Prior to the conduct the study, request letter has been forwarded to the office of the principal of Santol Vocational High School seeking permission to conduct the study. Upon approval, the researcher administered the 30-item test to both control and experimental group. Then, the control group taught the lesson within the allotted time, while the experimental group taught the lesson and a series of days incorporating the 5-MRRD. After implementing the intervention Posttest was conducted.

E. Data Analysis Procedure

The data gathered were properly checked, recorded, tabulated, analyzed, and interpreted. The researchers used Microsoft Excel to calculate and analyzedata. For problem 1, the researcher will use mean, frequency, and percentage to determine the participants' performance levels before and after the implementation of the intervention.

For problem 2 and 3, the researchers will apply an independent sample t-test to determine whether there is a significant difference in performance levels between the control and experimental groups before and after the intervention.

F. Ethical Considerations

The researcher employed ethical considerations prior and during the conduct of the study. the researchers requested to the principal of Santol Vocational High School in the conduct of this study. Then, informed consent was obtained both parents, guardians, and students who participated prior to the study. Moreover, the confidentiality of the participants was prioritized. The researchers rest assured the conduct of this study employs honesty, transparency and preserving the highest level of objectivity throughout the research was considered.

III. RESULTS AND DISCUSSION

1) Level of Performance of the Participants in the Control and Experimental Groups in the Pretest and Posttest

Table 1. Level of Performance of the Participants in the Control and Experimental Groups in the Pretest and Posttest

VARIABLES		MEAN	LEVEL OF PERFORMANCE
Pretest	Control	14.31	Satisfactory
	Experimental	10.19	Fairly Satisfactory
Posttest	Control	15.03	Satisfactory
	Experimental	19.03	Very Satisfactory

Table 1 presented the level of performance of the participants in the control and experimental groups in the pre and post-tests. Pretest results of the control group Before the intervention, the average score of the control group students at the pretest was 14.31, showing an adequate performance. The mean score on the pretest for the experimental group of 10.19 was strongly suggestive of fairly satisfactory performance. This indicates a significant difference between the two groups at the beginning.

It was also observable in Table 1 that the control group's mean posttest score was 15.03 reflected as satisfactory. Even after these changes, the performance level for the control group remained uniform and categorized as satisfactory. In contrast, the experimental group's mean score on the posttest was 19.03 reflecting a very satisfactory performance.

2) Comparative Analysis between the Pretest and Posttest in the Experimental Group

Table 2. Comparative analysis between the Pretest and Posttest in the Experimental Group

EXPERIMENTAL GROUP	MEAN	T-STAT	T-CRITICAL	REMARKS
Pretest	10.19	-11.50	2.03	Significant
Posttest	19.03			

Table 2 shows the analysis between the difference of the student level of performance before and after the use of 5-MRRD in teaching integer operations. The mean before the before the use of 5-MRRD was 10.19, whereas the after the use of the method the result was 19. 03. This shows that the mean after applying the 5-MRRD is greater than the mean of before applying the method. The absolute value of the t-statistics is |11.50| is greater than the t-critical 2.03 which indicates significant. This implies that there is a significant difference between the level of performance of the student before and after applying the 5-MRRD in teaching integer operations.

3) Comparative Analysis between the Posttest of the Control Group and Experimental Group

Table 3. Comparative Analysis between the Posttest of the Control Group Compared to the Experimental Group

VARIABLES		MEAN	T-STAT	T-CRITICAL	REMARKS
POSTTEST	CONTROL	15.03	-2.53	1.99	SIGNIFICANT
	EXPERIMENTAL	19.03			

Data presented in Table 4 shows the analysis between the difference in the posttest performance of the student from the control and experimental groups. The mean of the control group obtained 15.03, whereas the experimental group achieve a mean score of 19.03. This shows that the mean of the group received the 5-MRRD method was higher than the other group. Also, the absolute value of the t-statistics is |-2.23|is greater than the t-critical 1.99 indicates significant. The result implies that the applying instructional methods applied to the experimental group significantly improved performance than the traditional method used by the control group.

IV. CONCLUSION

Based on the findings of this study, it is concluded that applying the 5-minute rule review drill is an effective strategy to enhance the level of performance of grade 7 learners particularly in integer operations. The use of 5-MRRD promotes understanding and mastery in learning mathematics concepts. The significant difference between the level of performance of the control group and experimental group indicating improvement in their mathematical skills of the learners.

V. RECOMMENDATIONS

Based on the findings and conclusions made from this study, the researchers formulated the following recommendations:

1) The strategy may be used by the mathematics teachers in teaching integer operations

2) Similar study must be conducted to validate the results of these endeavors.

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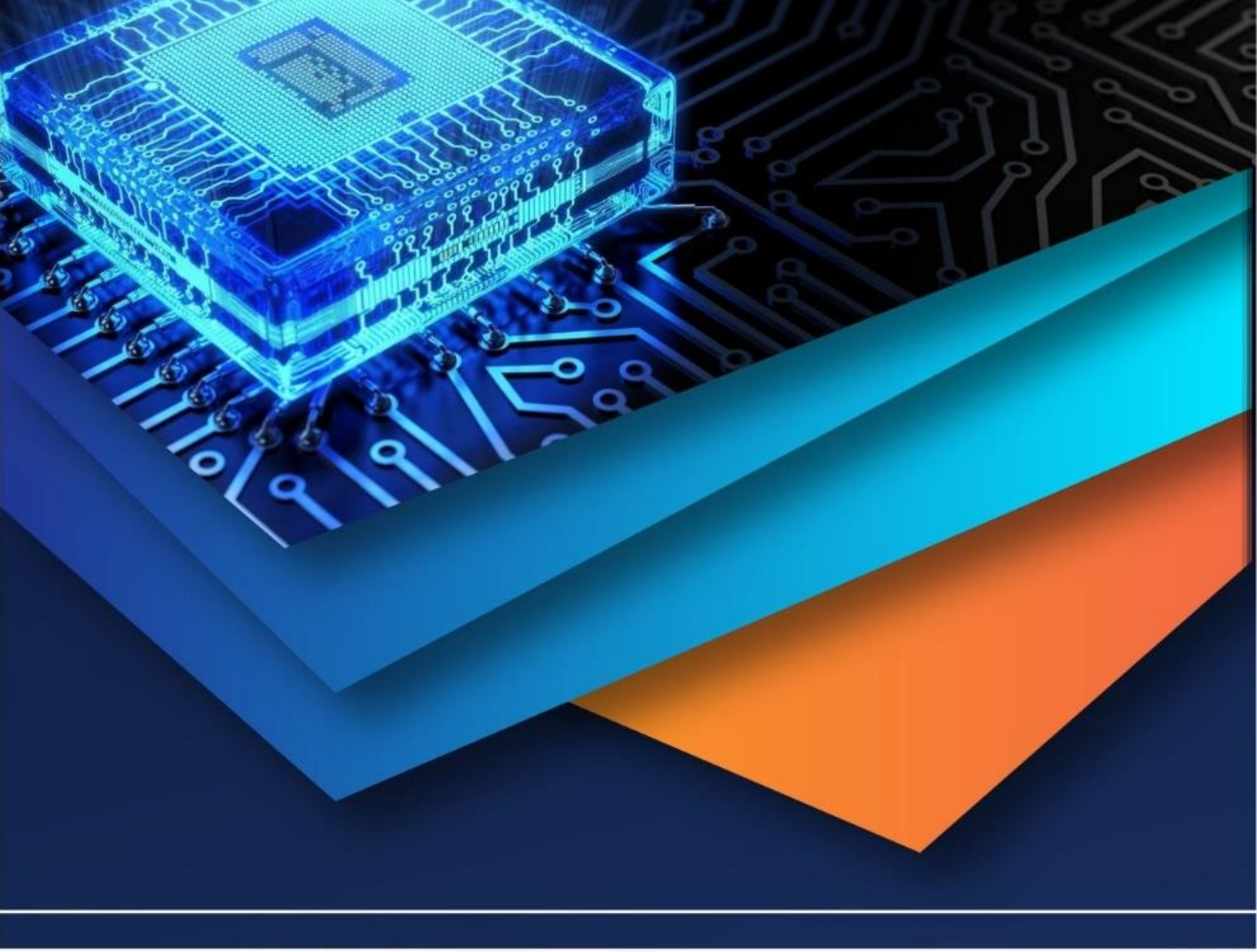
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