

## ROPE and RACE: An Ingenious Board Game for Intermediation in Mastering the Four-Fundamental Operations of Grade 5 Learners

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**ABSTRACT:** The study generally aimed to let selected grade 5 learners had the mastery on Four-Fundamental Operations using the ingenious board game, ROPE and RACE. This is a Quasi-Experimental research design using purposive sampling technique in selecting Grade 5 learners who were identified as low performer in the basic mathematical skills which are the four-fundamental operations. The results of the score of the respondents were 51.50 in the pre-test and 90.13 in the post-test. The increase of 38.63 justified that there was an improvement in the performance of the learners. It implies that the respondent shows mastery in performing the four-fundamental operations in mathematics. Based from the computed t-value which was compared to critical p-value, there was a highly significant difference in the performance of selected Grade 5 learners. This shown that the use of ROPE and RACE board game was effective. This study is limited to 20 struggling learners in grade 5 in performing the fourfundamental operations and got the score of 20 and below. It covered the second quarter of the school year 2021-2022. With this implication in the educative process, the use of ingenious board game, ROPE and RACE, gives mastery to learners in performing the four-fundamental operations. The mechanics of the board game commit the mathematical skills and ability of the selected 20 Grade 5 learners in mastering the four-fundamental operations in mathematics. As a result, the intervention was effective and highly proposed.

**KEYWORDS:** Ingenious Board Game Four-Fundamental Operations

### 1. INTRODUCTION

Generally, mathematics is one of the toughest subjects that learners always moaning. A lot of factors are considered in making interventions and many teaching strategies and techniques are made to resolve the problem, but still it is remained to be a problem today. As every learner being promoted by the next grade level, it is observed that most of the lowperformers in mathematics retained their status in numeracy due to lack of mastery on fourfundamental operations. It is always important to first dig the solid foundation on the basic skills in mathematics because as their grade level rises, the level of learning competencies in mathematics are still reaching that appropriate level to go beyond learning progress and learners should be part of that furtherance. As well as in secondary level, it is observed that learners with weak foundation on four-fundamental operations gave them struggles on entering to a higher-level math lesson. Furthermore, Cvencek 2016, Kapur et. Al 2015 and Arens, et. Al., 2016 emphasized in their study that early numeracy skills must be develop in early ages to gain mastery in mathematics. This led the researcher to craft an intervention that would satisfy the learning needs of the learners and will sustain a lifelong learning in Mathematics.

As a result of pre-numeracy assessment to over seventy-eight (78) learners in grade 5, only quarter portion passed it as estimated and the rest failed to reach the passing score. Taking into consideration, about the effect of global pandemic and other relating factors, there is still a difficulty that needs to be work out on creating an ingenious board game which is the ROPE and RACE as intervention program with regards to quality education. Moreover, the intervention crafted contains counting examples about the four-fundamental operations that surely sustain fun learning and to reciprocate the mindset of learners that math is boring.

### 2. THE COMPREHENSIVE THEORETICAL BASIS

Having a strong foundation in Mathematics was significantly a prolong benefits to all learners especially for those in elementary levels since all the basics are ground to it. Based on the study of Engel, Claessens, & Finch, (2013), students' prior knowledge is still a factor in improving the mastery of the basic mathematical skills. In Elementary level, the most common mathematical skills that needs to improve are the four-fundamental operation which are Addition, Subtraction, Multiplication and Division. Prior to the study of Raguraman, (2021), current and coming generation of education demand the underlying mathematical skills and learning in concluding results of the problem

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In relation to this, Andika, et. Al. (2019) identify the effectiveness of board game in teaching mathematics. It develops the intellectual ability of the learners to cope up with the counting examples not feeling the difficulty of doing it. However, Tobias, et. Al., (2014) game-based learning should have a good instructional design to build a strong foundation especially in enhancing the mathematical skills. The concept of the ingenious board game should be based on the needs of the learners to ensure the effectiveness of the intervention in refining the basic mathematical skills. In the developing the ingenious game board, the researcher used the snake and ladder game board as the basis of creating the concept of it. (Tolentino and Roleda, 2019) emphasized that Game Board Learning should have five (5) main elements namely; points, badges, leader boards Rules and Levels. Without these any or all of these elements cannot be considered as gamified classroom. Games provide stories and data, presented during a new format. They encourage critical thinking and problem solving and achieve objectives of curriculum frameworks. Board games can provide students with opportunities to use concepts they need learned. Board games promote collaboration, inquiry, and important thinking. By using games that support the curriculum, educators can give them opportunities to experience play, while at the identical time promoting learner's achievement.

Ingenious board games are likewise effectual for objectives other than expanding information. As per Charlier and De Fraine (2014), ingenious games can be a charming and persuasive strategy for learning content and improving gathering connections, rivalry, and fun. Martins et al. (2012) announced that board games instruct instructive substance in a social interaction include connections with other people; in this way, they favor information obtaining by empowering trades of encounters and learning. Besides, Wanyama et al. (2016) showed that, as a technique for healthy schooling, board games increment the obtaining of information just as result in more certain encounters than do wellbeing talks among the two members and facilitators. Amaro et al. (2012) observed that class instructors noted upgrades in learner's interest and enthusiasm for the ingenious board game. Taken together, these discoveries propose that ingenious games might work on the inspiration of learners learning capacity. Moreover, Karbownik et al. (2011) showed that an ingenious board game was energetically invited by the learners; as they would see it, it worked with clinical reasoning and friend correspondence. Accordingly, ingenious board games may likewise affect relational cooperation among learners in achieving mastery of the four-fundamental operation.

In concern with the current struggle of selected grade 5 learners, the researcher take on the challenge of achieving the mastery on four-fundamental operation as these are the ground level of the basic mathematical skills that needs a solid foundation. The ingenious board game, ROPE and RACE (Reinventing of Play Exercise and Refining Ability through Counting Examples) is an intervention in Mathematics crafted by the researcher that is inspired by the concept of snake and ladder board game but fully modified in behalf of the objective and goal of the researcher. It is modified according to the learning needs of the selected grade 5 learners specifically in elementary level. The ingenious board game is a localized resource material that aims to lessen the low performers of elementary pupils in the four-fundamental operation. The researcher crafted this board game to give learners a new experience in learning mathematics with fun and social interaction.

### **3. METHOD**

This study used Quasi-experimental method of research to assess and determine the difference between the pretest and posttest results in four-fundamental operations of selected Grade 5 learners of Talisay Elementary School after using the Ingenious Board Game.

The study was conducted in Talisay Elementary School during the school year 2021 - 2022. The school is considered as one of the large schools in Tiaong District II with seventeen teachers headed by Principal I.

According to the post numeracy test result instituted by the Division of Quezon last school year 2020 – 2021, the school did not reach the target goal of 75%. Consequently, the school not only want to sustain a good performance in Mathematics but to have mastery in the four-fundamental operations. Talisay Elementary School desires to escalate learners' performance to mastery despite of the current situation in education. Since, the researcher is a Mathematics teacher, in response to the challenge, finding immediate action to the arising problem of the school are considered particularly in mastering the fourfundamental operations of selected Grade 5 learners.

The researchers utilized purposive sampling technique wherein the respondents were chosen on the basis of the researchers' knowledge of the information needed after giving pretest.

The respondents in this study are the selected 20 Grade 5 learners of Talisay Elementary School from two sections: Callalily and Dahlia, school year 2021 – 2022, who identified as having low performance in four-fundamental operation In Mathematics. The researchers of this study conducted a pretest to identify the learners having low performance in the four-fundamental operations. The Ingenious Board Game in mastering the four-fundamental operations and scoresheets were prepared and utilized by the researcher.

Every week there was an elimination games for the selected 20 grade 5 learners. The game mechanics were win-vs-win and lose-vs-lose until the last one standing. In every match, the researcher checked their scoresheets to make sure that they have a correct computation. The learners are match to their co-learners in the same sitio. The partition of sections in grade 5 were based on the

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sities they belong to easily track learners by the teachers if they have a problem that is why even if it is pandemic they still experience a fun and engaging learning in mastering the four-fundamental operation in Mathematics.

Regular monitoring on learners' performance was done to ensure their participation and engagement to the intermediation. After the period of time allotted for the program (12 weeks), the respondents were given posttest through home visitation to assure its reliability and validity, to see if there was an improvement to their performance. All the data gathered were subjected to statistical treatment for valid result and interpretation. The mean percentage score was computed to determine the increase between the pretest and posttest. The difference between the pretest and posttest was computed and interpreted using t-test.

The data to be gathered and collected were interpreted and analyzed using the simple mean percentage to determine the average score of the respondents before and after the utilization of the intermediation program. To find out the significant difference of the pretest and post test scores of the respondents, the T-Test were also applied.

### 4. RESULTS AND DISCUSSION

This part presents the result of the study based on the gathered data. It likewise gives the corresponding analysis and interpretations to answer and justify the problems stated in this study.

**Table 1. Mean Percentage Score of Grade 5 Learners Before Using the Ingenious Board Game (ROPE and RACE)**

PRETEST			
Grade Level	Number of Respondents	Total Score	MPS
Five	20	412	51.50

As shown in table 1, the pretest result revealed an MPS of 51.50 with a total score of 412 in a 40-item test. It is indicated that the respondents were poor performers in the fourfundamental operations in Mathematics. As stated in the study of Capuno, et.al., (2019), among Filipino learners, Mathematics is one of the hardest subjects in high school and elementary. This is the reason why the researcher pursues to craft an intervention that will utilize fun learning in mathematics, particularly focusing on four-fundamental operations.

**Table 2. Mean Percentage Score of Grade 5 Learners After Using the Ingenious Board Game (ROPE and RACE)**

POSTTEST			
Grade Level	Number of Respondents	Total Score	MPS
Five	20	721	90.13

The posttest result allude that 20 respondents got a sum score of 721 in a 40-item test with an MPS of 90.13. It was evidently shown that the scores and performance on the four-fundamental operations of the learners improved and its MPS was progressively accelerate by 38.63% from 51.50 % to 90.13%. It was legged up by the study of White, & McCoy, (2016) that playing board games, may be a very effective strategy, particularly linear ones that include numbers, in developing the numerical and representational math skills necessary for the numeracy development of the learners. Linear Board Games overlook its effect on increasing knowledge and acquiring preliminary numeracy skills. In addition, playing board game develops the mathematical self-concept of the learners. It merely constructs the ideas of learners to have a self-technique in calculating numbers in a fastest and easiest way. It will give opportunity to learners on how they will discover their own strategies of using mental math.

**Table 3. T-test Result on Finding the Significant Difference in the Mean Percentage Score of Grade Five Learners Before and After Using the Ingenious Board Game (ROPE and RACE)**

Variables Compared	df	Means	Computed t -value	Critical p value	Decision	Impression @ 0.05 level
Pretest	19	$X_1 = 20.60$	-4.44	1.72	Reject $H_0$	Highly Significant
Post Test		$X_2 = 36.05$				

As evidently seen from the computed t-value of -4.44 and the critical p-value of 1.72, the researcher rejected the null hypothesis which is significant at 0.05 level. This showed that there was a highly significant difference in the performance of selected Grade 5 learners. This implied that the use of Ingenious Board Game (ROPE and RACE) helped the learners to increase their academic performance. Recent evidence proved that board game consisting numbers in elementary have mastery of preliminary numeracy skills (Andika, et. Al. 2019). In the previous study, Linear Board Games displays an impact on escalating knowledge and acquiring basic numeracy skills in elementary level, especially in children with low-income parents. The importance being applied to the context of classroom learning are shown from Linear Number Board Games. In addition, with these factors, another thing that influences learner's early numeracy is a mathematical self-concept. Mathematical self-concept appears hand in hand with learner's early numeracy

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The Ingenious board game, ROPE and RACE is an intervention in Mathematics that is inspired by the concept of snake and ladder board game. It is modified according to the learning needs of the selected respondents specifically in elementary level. The Ingenious board game is a localized resource material that aims to lessen the low performers of grade 5 learners in the four-fundamental operations. The researcher crafted this board game to give learners a new experience in learning mathematics, particularly in the four-fundamental operations.

The variation in the pretest and posttest results shows that there is an improvement in the learners' performance in four-fundamental operations after the utilization of the intervention. This was reasonably seen by the increase in the mean. According to Cruz & Lapinid (2014), Basic mathematical skills are the lesson in mathematics that needs to be focused on because it is the basic operations used in word problems. It is beneficial for learners to master the four-fundamental operations in the higher level of learning competencies in Mathematics as preparation in the secondary level.

### 5. CONCLUSION

After the clear and comprehensive interpretation and tabulation of the data gathered, the researcher inferred with the conclusion based on the hypothesis that there is no significant difference on the results of the Pretest and Posttest on four-fundamental operation of the Grade 5 learners before and after using the ingenious board game, ROPE and RACE is REJECTED. Ingenious Board Game (ROPE and RACE) is an effective tool that can help in mastering the four-fundamental operations in Mathematics. It can also help school improve instructions and academic performance of the learners. Therefore, the researcher conclude that there is a significant difference on the result of the pretest and posttest before and after the implementation of Ingenious Board Game (ROPE and RACE) in mastering the four fundamental Operations of Grade 5 learners in Mathematics.

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