GRADE 3 MATHEMATICS PERFORMANCE IN THE LENS OF REALISTIC MATHEMATICS EDUCATION (RME)

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ABSTRACT

This quantitative descriptive correlational research study aimed to determine the level of mathematics performance and also the level of preference of the Grade 3 pupils in Boston Central Elementary School in terms of the RME - Based Perceived strategies, the significant difference of the perceived strategies and the relationship of mathematics academic performance of the students and the Realistic Mathematics Education - Based Perceived Strategies. The instrument used to gather the level of performance and preference of the students was developed by the researcher and validated by some experts. With the instrument used, tabulation and analysis of the data, the results revealed that the Mathematics Performance was Satisfactory. Moreover, with the 4 RME- Based Perceived Strategies as indicators, Guided Practice was revealed as the most preferred strategy in teaching and learning mathematics among other indicators such as Graphical Representations and Manipulatives, Collaborative Activity and Individual Activity. Thus, the research findings suggested to integrate Guided Practice in the lens of Realistic Mathematics Education to improve the Mathematics Performance of the students. It is also recommended to the educators, the community, and parents to be knowledgeable on how important to consider the preference of the students and the importance of strategies in the lens of Realistic Mathematics Education (RME).

Keyword: *guided practice, graphical representations, collaborative & individual activity*

1. INTRODUCTION

Mathematics supplies solutions to any situation in the actual world (Laurens, 2017). The formal universe of mathematics, like the wonderful world of fables, can provide a problem-respondent environment as long as it fits into the actual category in students' imaginations (Demirdöen and Kaçar, 2010). The anxiety level of a student enrolled in a mathematics class with Realistic Mathematics Education, their chances of succeeding increase (Veloo & Zubainur, 2014). Mathematics is regarded as one of the most important subjects in Asia, and students are encouraged to study it (Leatham & Peterson, 2010; Ronis, 2008). In most Asian countries, mentoring techniques on children's mathematics achievements are far more active (Wei & Dzeng, 2014). Etcuban and Pantinople (2018) also supported that this demonstration resulted in an appealing modification in learning behavior. Mathematics is crucial and so necessary as a subject practically in every field as Blömeke and Delaney (2014) stated. Educational modules in this series in the Philippines feature a specific topic and instructional plan requirements to enable understudies to develop cosistent and numerical abilities required to grasp fundamental mathematical ideas (Guinocor, 2020). However, Almerino (2020) stated that there is still evidence of poor performance in this area. Filipino students thrive in acquiring knowledge but struggle in subjects that need higher order thinking skills (Dinglasan et al., 2013; Ganal et al., 2014). Even college students face difficulties in understanding and comprehending mathematics (Americans, 2009; Presmeg, 2006). Realistic Mathematics Education (RME) conceptualized that mathematics is really necessary for success and be in intimate contact with child - oriented cases that occur in everyday life.

In the RME approach, real-life situations are designed to enhance the re-exploration process by allowing students to access formal mathematical knowledge (Karaca, 2017). Real-life challenges are important in RME because they allow students to see how their learning is applied in the real world, which is motivating (Laurens, 2017). RME (Realistic Mathematics Education) is one of the techniques in addressing the issues that arise from traditional and abstract mathematics education (Bray & Tangney, 2015). With this, as the researcher of this study observed common problems within the local setting, this study aims to determine the level of preference of the students in terms of the strategies in learning mathematics in the lens of Realistic Mathematics Education and to determine the significant difference of the perceived strategies, and to develop a research-based strategy as an intervention that will help in improving the mathematics performance of the students.

2. REVIEW OF RELATED LITERATURE

This chapter discussed the students' performance in mathematics, factors affecting mathematics academic performance of the students, and lastly, the academic performance of students in mathematics in the lens of Realistic Mathematics Education (RME). Variety of existing related reviews and findings of other studies supports this chapter and this study.

2.1 Students' Performance in Mathematics

Many children struggled in math, particularly problem-solving (Garderen et al., 2006). However, Berch et al. (2007) said that students must master mathematics because of its importance in the workplace and in everyday life. They must be able to solve problems, as problem solving is essential for the development of human abilities (Subahan, 2007). Problem-solving required a wide range of mathematical abilities but many students lack the fundamental mathematical skills they require (Rosaznisham et al., 2004). Moreover, Baticulon et al. (2021) stated that another problem that is contributing to the difficulty of the students in learning mathematics is the transition from a classroom to a home learning environment are noise and other distractions that may disrupt students who do not have access to a personal physical online learning environment. The teaching method also changed, there are some portions of the syllabus that students must learn on their own such as asynchronous session where tasks that would not be possible in a face-to-face setting (Bringula et al., 2021). Tambychik et al. (2010) emphasized in their study that the lack of numerous math skills made it difficult to solve the problem, during the decision-making and problem-solving process, students must apply and integrate a variety of mathematical concepts and skills. Garderen (2006) stated that a lack of visual-spatial skills might make it difficult to differentiate, relate, and organize information in a meaningful manner.

The reasons for kids' lack of mathematics skills vary (Hill et al. 2008). Incomplete mastery of number facts, computational weaknesses, inability to connect conceptual aspects of math, inefficiency in transferring knowledge, difficulty in making meaningful connections among information, incompetency to transform information mathematically, incomplete mastery of mathematical terms, incomplete understanding of mathematical language, and difficulty in comprehending and visualizing mathematical concepts leads variety of errors and misunderstandings during the problem-solving process (Nathan et al., 2002). Latha (2007) also emphasized that error analysis revealed that students lacked confidence due to a lack of conceptual comprehension, arithmetic and process knowledge. Many students were unable to give meaning to the problems and were unable to develop and execute problem-solving solutions, if the math abilities required are difficult, better programs to address the problems could be devised if this is recognized (Johan, 2002). Furthermore, if the learning methodologies and teaching strategies used did not meet the intellectual needs of the pupils, this could cause students to struggle with math, in order to adopt effective teaching strategies and promote meaningful learning among students, teachers must first understand their students' potential, issues, and learning obstacles (Meese, 2001) stated.

Barwell (2005) emphasized that pupils must learn to read and answer word problems. He says that simply decoding words or extracting arithmetic operations may not be enough; pupils must learn to read between the lines in order to comprehend what is expected of them mathematically. Because regular English has a high degree of redundancy, it has a substantial impact on how pupils (mis-)read mathematical English (MacGregor, 2002). As a result, pupils learn to skim read, picking out essential phrases to get to important information, such as when reading a book In comparison, mathematical English is succinct; each word has a specific purpose with little repetition, and each thick sentence contains a lot of information (Padula et al., 2001). Students who apply the same reading abilities they learned in elementary school to reading ordinary English. As a result, the tendency to ignore crucial information in mathematical English writings may be a disadvantage (MacGregor and Raiker, 2002).

2.2 Factors Affecting Mathematics Academic Performance of the Students

The abilities to give good concentration, to make meaningful perceptions, to think logically and to use memory effectively are important factors in learning skills and solving problems particularly in mathematics (Stendall, 2009). These abilities vary among students, cognitive and psychological factors which could affect the ability to use mathematics skills and thinking in problem-solving (Tambychik et al., 2010). Miranda (2006) stated that children might experience difficulties in thinking and learning when they demonstrated difficulty in giving attention, describing orientation of shape and space, making perception by visual and auditory, memorizing simple things and understanding language, consequently, students might struggle in different phases in the process of problem-solving. A large number of students do not understand fundamental concepts in math (Gallo & Johnson, 2008). As a result, they recommend that professors identify students with poor basic math skills early on so that remediation can be provided to bring them up to speed (Gallo & Johnson, 2008). Math Fluency (2011), students must be able to recall basic math information fluently in order to achieve higher-order math skills, according to educators and cognitive scientists (Math Fluency, 2011). Nicolaidou and Philippou (2003) investigated the relationship between fifth-grade students' attitudes toward mathematics, self-efficacy beliefs, problem solving, and achievement, and discovered a substantial association between achievement and attitude. The beliefs, attitudes, and emotional reactions that pupils have when studying mathematics were investigated by Ignacio et al. (2006). The goal was to show that having good traits, beliefs, and attitudes about themselves as learners is a source of motivation and success expectations in dealing with this subject. Based on his findings, he advised the implementation of initiatives and programs for the prevention and intervention of mathematical learning challenges, as well as emotional education in this area of knowledge. The goal will be to increase students' interest in mathematics and to improve their attitudes, beliefs, and emotional reactions to it while they are learning it.

One of the most important factors determining participation and success in mathematics is one's attitude towards mathematics, it is worth noting that the independent variable (attitude) for girls and boys had a strong relationship with the dependent variable in her study Influence of attitude on student performance in mathematics curriculum (Manoah, 2011) as concluded in her study. Families have a significant impact on their children's academic and life success (Henderson & Mapp, 2002). Rongjin and Leung (2002) investigated the impact of parents on Chinese children's mathematics teaming and discovered that, regardless of their educational background or socioeconomic status, parents had high expectations for their children's education and were heavily involved in their children's mathematics. Cai (2003) investigated the roles of the parents in the United States and parents in the People's Republic of China play in their children's arithmetic education. It also looked at the link between parental participation and pupils' ability to solve mathematical problems. The findings of this study back up the claim that parental participation is a statistically significant predictor of their children's mathematics achievement on a global scale. Parents in China looked to play a more positive impact than parents in the United States (Cai, 2003) concluded.Olatoye and Agbatogun (2009) discussed that the term parent involvement refers to a variety of ways that parents participate in education and with schools, and that experts in the field agree on the importance of family-school connections. Their study, which looked at math and science achievement in public and private primary schools, found that parental involvement is an important predictor of math and science achievement. Parental involvement in mathematics, as well as good habits and abilities that parents may encourage at home definitely help students succeed in mathematics (Le Faivre's, 2009) emphasized.

2.3 Academic Performance of Students in Mathematics in the Lens of Realistic Mathematics Education (RME)

Since the 1970s, Utrecht University has held a research institute dedicated to reviving mathematics education. Hans Freudenthal founded the Freudenthal Institute. It was located in the Netherlands and included a variety of characters. Realistic Mathematics Education was the title of Hans' project (RME). RME was based on everyday concepts. It was later adopted by a number of countries, including the United States and some African nations. Moreover, RME is a potential way to correct and improve students' grasp of mathematics ideas, according to research undertaken in several countries including poor nations such as Indonesia (Fauzan, 2002).

RME (Realistic Mathematics Education) is a method of teaching mathematics. Hans Freudenthal, a Dutch mathematician and lecturer, founded the Freudenthal Institute in Holland in 1971 under the auspices of Utrecht University (Cakir, 2013). Hans Freudenthal explained that mathematics began with real-life problems and was changed into a formal system when the real world was put into a mathematical structure. Freudenthal went on to say that presenting formal mathematics content before the practice stage was an anti-didactical learning strategy (Altun, 2006). Based on the concept of Realistic Mathematics Education (RME), mathematics is necessary for success and be in intimate contact with child-oriented cases that occur in everyday life. Eccles et al. (2002) discovered in their investigation that the favorable effects as the age and grade level of primary school pupils increased, so did their beliefs about mathematics, reading, music, and sports interest abilities. Wigfield et al. (2002) investigated the interest, usefulness, and beliefs of primary school pupils in task interest, mathematics, reading, music, and sports activities over the course of a three-year study. According to the findings, learners' interest in mathematics, reading, music, and sports activities decreased as their age and class levels increased.

In the study of Xiang et al. (2003), it has been found that class and age levels that younger learners' attitudes about accomplishment expectations and mission ideals are relatively positive. Expectations of accomplishment and beliefs in mission values become increasingly negative and poor as elementary school kids advance in age and class level. The reason for this is because as primary school kids get older, their expectations of success may stem from a more accurate and realistic assessment of their talents and mission convictions. Furthermore, based on the study of Karaca et al. (2017), RME-based activities not only improved students' numbers and operation unit achievement, but also had a beneficial impact on late-changing affective learning outcomes like self-report. It should be noted that the inclusion of abstract and challenging topics into the context shifted the students' mathematics course self-reports in a negative direction, and that the students' failure to make connections between abstract topics and real-life played a major role in the emergence of this negation (Ozkaya, 2017). Gravemeijer et al. (2010) concluded that in the RME approach, real-life situations are designed to enhance the re-exploration process by allowing students to access formal mathematical knowledge. Real-life challenges are important in RME because they allow students to see how their learning is applied in the real world, which is motivating.

Mathematics anxiety is caused by students' discomfort in completing arithmetic tasks (Zhu, 2009). As a result, it can be concluded that RME-based activities not only improved student achievement and positive attitudes, but also reduced arithmetic fear, this outcome is consistent with research findings stating that the RME technique, by involving students in real-world challenges, greatly increased their understanding of mathematical concepts and skills (Karaca, 2017). Eccles et al. (2002) found that generalizations reduced anxiety in pupils. Based on the study of of Laurens et al., (2017), RME provided pupils with greater opportunities to contribute in class. Understanding contextual difficulties, addressing them, and finding solutions are all ways to learn. They were allowed to think and talk freely with their spouses. They were encouraged to express their thoughts and opinions with their classmates, especially when they learned new math concepts and expanded their knowledge. They were also able to draw a conclusion based on their findings. In comparison to kids who learnt using traditional methods, their cognitive achievement improved. Pupils who were taught using RME outperformed students who were taught using traditional methods. This study's findings imply that teachers should use RME and games to boost students' intellectual abilities so that meaningful and contextual learning may be achieved. Future research should look into the impact of RME on students' attitudes, problem-solving abilities, learning interest, and other mathematics-related characteristics.

The contextualized problem-solving practice is thought to have a good impact on students' cognitive achievement in relation to their mathematical understanding (Bonotto, 2008). The greatest strategy to teach mathematics is to give kids meaningful experiences by having them solve problems that they confront on a daily basis dealing with contextual issues (Abramovich, 2019). The majority of the students' activities are interactive and are intended to pique their interest in mathematics (Fauzan et al., 2002). Pool et al. (2012), define guided practice as teacher and students working together on challenges because the teacher directs the learner through the same step-by-step procedure that is described in step-by-step modeling, the practice is directed. . To guide students, teachers use specific language and hints. Cues can be low-reasoning questions, directives, reminders or prompts. In other circumstances, the teacher may display work on paper, on a whiteboard, or on technology during guided practice, and students may solve issues using the same mediums (Hunt, 2014). Moreover, Montague (2011) explained that the teaching instructing is highly structured and organized programs were effective. The findings of a meta-analysis by Gersten et al. (2009) corroborate this strategy, identifying five teaching components that appear to be beneficial for students with MD: clear instruction, the use of graphical representations and manipulatives, judicious selection and sequencing of instructive examples, and encouraging students to express their own techniques or the strategies that the teacher has modeled.

It was cited in the study of Olanrewaju (2019), Collaborative learning and activities is best accomplished in a group setting where students can freely engage with one another and collaborate on their ideas. CLS is a type of learning strategy that has evolved over the last thirty years and is still evolving. It promotes a hands-on pedagogical approach to learning. Collaborative learning strategy is a process which two or more people learn or attempt to learn something together (Briandley et al., 2009). Unlike individual learning strategy, people who engage in collaborative learning capitalize on one another's resources and skills, asking one another for information, evaluating one another's work, among other things (Chiu, 2004). Collaborative activities' importance in learning mathematics was emphasized by Bartz (2015), he said that it improves classroom preparation and engagement, as well as better confidence in mathematics skills. Students also show a greater sense of responsibility to the group for the subject and role they play. It promotes a collaborative learning strategy in which students work together to solve a problem, accomplish a task, or create a product. Moreover, collaborative learning strategy increases students' interest towards Mathematics and invariably enhances achievement (Lawrence, 2004). Fasli and Kopoules (2005) found that collaborative learning strategies encourage students to acquire an interest in mathematics that results to an improved achievement. The implementation of good inventive tactics that stimulate their interest and achievement, such as collaborative learning strategies, can boost their interest and achievement (Ardodo and Gbore, 2012).

Bartz (2015) discussed that individualized learning was popular in the 1970s and was supported by many educators as freeing up students to pursue learning and knowledge on their own. Over the last several decades, technological improvements have benefited personalised education by increasing the amount and variety of information available to pupils outside of the classroom. Saefudin et al. (2012) mentioned that RME aids in the development of learners' cognition at all stages of creative thinking. The creative problem-solving process is actually more directed and concentrated on people' cognitive and intellectual functions (Almeida et al., 2008). Students' creative thinking and accomplishment are consistently boosted by the structure of intellectual ability (Treffinger, 2004). RME has produced mathematics curriculum and pedagogy from its inception (Karaca et al., 2017). Clements and Sarama (2013) also emphasized that RME's primary qualities include the formation of meaningful contexts, and the application of meaningful contexts and develops model that allows for the transition from contextual to formal mathematics, students' reconstruction of mathematical concepts, student-teacher interaction, and the sense of mathematics as an integrated discipline. These features lead to the progressive mathematical process, which allows learners to correlate problems with contexts, find relevant mathematical ideas, solve problems, and understand solutions in light of their contexts into comprehending contextual difficulties, debating problems, and proposing solutions to problems (Yuwono, 2007) concluded.

In the study of Burns et al. (2012), teachers may need to incorporate instruction in foundational skills necessary to fill in knowledge gaps such as difficulty with multiplication concepts, difficulty with solving word problems, while concurrently working on grade-level mathematics material (i.e., the Tier 1 general education curriculum material) when designing the intensive intervention's scope and sequence and selecting an intervention program(s). If a student has trouble with automaticity of addition, subtraction, multiplication, or division number combinations, teachers should include mathematics fluency development activities in the scope and sequence (Burns et al., 2012). Fuchs et al. (2005) discussed that teachers explicitly relate mathematics concepts and procedures through step-by-step modeling and guided practice. To reinforce concepts such as place value, teachers can employ tangible hands-on materials or pictorial representations (Bryant & Chavez et al., 2008). The concrete representational-abstract framework for imparting mathematics in many modes is followed by hands-on materials, graphical representations, and virtual manipulatives said Flores et al. (2014) as cited in (Miller & Hudson, 2007).

In the study of (Jitendra et al., 2013), it was revealed that graphic organizers can alsobe used by teachers to help students grasp terminology or concepts, for example, employed visual organizers to organize information from word problems. The graphic organizers were differentiated by word problem type and represented a word problem's underlying schema. Without the use of extraneous materials, conceptual learning that is learning about mathematical concepts rather than methods is possible. At the end of each class, teachers perform a review of ideas and procedures after step-by-step modeling and guided practice. This review might be focused on the lesson's skill or it can be cumulative, incorporating many types of tasks. It's best if the review isn't too long (i.e., 1 to 3 min). In addition, if any problems are answered wrong, the teacher should provide corrective comments (Fuchs et al., 2009). Every lesson has a motivating component. This component of motivation keeps pupils on task and shows them how they advance during the lesson (Bryant et al., 2008).

3. METHODOLOGY

3.1 Research Design

This study utilized a quantitative descriptive correlational research design using a researcher-made questionnaire to determine the significant difference among the different levels of preference and significant relationship between mathematics academic performance and the perceived intervention strategies among Grade 3 students in Boston Central Elementary School at Poblacion, Boston, Davao Oriental, Philippines.

Quantitative research is a process that involves collecting and analyzing numerical data. A quantitative method was deemed suitable since the research requires quantifying the level of preference of the students in terms of the perceived strategies by tabulating the mean scores of the variables, coefficient of correlation and the significant difference. Additionally, the descriptive design was also suitable considering that the research study answered questions about the determined strategies with accuracy and in a systematic process. Lastly, the comparative research design was applied to determine the significant difference among the different level of preference in terms of strategies, and the significant relationship between the RME - Based perceived strategies and levels of mathematics performance.

Also, the data acquired by the researchers have undergone statistical, mathematical, and computational techniques in which its results are depicted in numerical form. Furthermore, descriptive comparative research is a sort of quantitative study. A method that describes the characteristics of the population or phenomenon that focuses more on the “what,” “when,” “where,” and “how” instead of the “why” of the research subject is called descriptive research. In other words, this summarizes the study's subject without going into detail into "why" a particular phenomena occurs, using a systematic methodology that will yield measurable data. Meanwhile, the comparative design is a statistical measurement that attempts to draw a conclusion among two variables. This is consistent with the researcher's goal of identifying group commonalities and differences.

3.2 Research Instrument

The research instrument of the study was composed of two parts. The first part was a summative that assessed students’ level of mathematics performance. The validity of the questionnaire was accomplished through expert’s validity as it concerns on the content validity (See Appendix B). Additionally, the reliability of it was accomplished through Cronbach’s Alpha Coefficient of 0.801. The second part of the research instrument was a researcher made and contextualized to Realistic Mathematics Education (RME) which underwent validity and reliability testing. Validity test was established through factor analysis with KMO of 0.392 (acceptable value is greater than 0.05) and Bartlett’s Test of Sphericity of 0.004 (acceptable value is less than 0.05) which both suggest that there is enough sample and correlation among data for the test. Scree plot and rotated component matrix showed that three (3) items of the pre-tested questionnaire must be removed to make it valid. On the other hand, reliability test was accomplished using Cronbach’s Alpha with coefficient of 0.700 (acceptable value is greater than 0.70) showed that the questionnaire is highly reliable after removing one final item.

3.3 Respondents of the Study

In this study, the researcher specifically had the Grade 3 students in Boston Central Elementary School. The population was stratified. The Set A of 3 sections were included in this study. Basically, the researcher used a probability sampling technique, specifically random sampling. It is a form of sampling that allows sample selection to be randomized, in other words each sample has the same probability of being chosen as other samples to serve as a representative of an entire population.

4. RESULTS AND DISCUSSION

This chapter presents the results, interpretation and discussion of the data collected from Grade 3 students. The data was presented in tabular form to facilitate analysis and for straightforward interpretation. The tables below show the level of mathematics performance, level of preference, significant difference among the different levels of preference and the significant relationship between the mathematics performance and the perceived intervention strategies of the Grade 3 students. In interpreting the results, different literature will also be presented that support the results.

4.1 Level of Mathematics Academic Performance

The level of Mathematics Academic Performance was described and revealed using descriptive statistics which are the mean value and standard deviation. The total score, lowest score, highest score, mean value, standard deviation and interpretation were shown in table 1.

Table 1: Mathematics Performance

	N	Minimum	Maximum	Mean	Std. Deviation
Summative Test Score	43	13.0	34.0	23.977	4.9401
Valid N (listwise)	43				

Total Score	Lowest Score	Highest Score	Standard Deviation	Mean	Grade Equivalent	Description
37	13	34	4.94	23.977	82.40	Satisfactory

The table presented that the Grade 3 students has *satisfactory* mathematics performance, it means that there are still many children struggled in math, particularly problem-solving (Garderen et al. 2006). However, Berch et al. (2007) stated that students must master mathematics because of its importance in the workplace and in everyday life. They must be able to solve problems, as problem solving is essential in the development of human abilities however, they appear to be having difficulty with their assignments, particularly with math problems or problem solving in mathematics (Subahan, 2007). Moreover, another problem that contributes to the difficulty of the students in learning mathematics is the transition from a classroom to a home learning environment. Noise and other distractions may disrupt students who do not have access to a personal physical online learning environment (Baticulon et al., 2021) stated. The teaching method also changed. There are some portions of the syllabus that students must learn on their own such as in Asynchronous session where tasks that would not be possible in a face-to-face setting (Bringula, 2021) emphasized. Also, Stendall (2009) stated that the abilities to give good concentration, to make meaningful perceptions, to think logically and to use memory effectively are important factors in learning skills and solving problems particularly in mathematics. These abilities vary among students, cognitive and psychological factors could affect the ability to use mathematics skills and thinking in problem-solving (Tambychik et al., 2010) said.

Miranda (2006) stated that children might experience difficulties in thinking and learning when they demonstrated difficulty in giving attention, describing orientation of shape and space, making perception by visual and auditory, memorizing simple things and understanding language, consequently, students might struggle in different phases in the process of problem-solving. Basic skills is also considered as factor in learning mathematics (Gallo & Johnson 2008). The beliefs, attitudes, and emotional reactions that pupils have when studying mathematics affect their performance as investigated by Ignacio et al. (2006). Lastly, the data is consistent, favorable, and convincing that families have a significant impact on their children's academic and life success (Henderson & Mapp, 2002)

4.2 Level of Preference in terms of the RME - Based Perceived Strategies in Learning Mathematics

In determining the level of preference of the students in terms of the RME - Based Perceived Strategies, the mean value and standard deviation shown in table 2 were used. Also, the interpretation of the preference of each perceived strategy was shown.

Table 2: Preference in terms of the RME - Based Perceived Strategies in Learning Mathematics

Factor	SD	Mean	Remarks
A. Guided Practice	0.41	4.53	Always Preferred
B. Graphical Representations and Manipulatives	0.53	3.95	Often Preferred
C. Collaborative Activity	0.58	3.62	Often Preferred
D. Individual Activity	0.73	3.22	Sometimes Preferred
Overall	0.35	3.83	Often Preferred

Based on the result, Guided Practice was the most preferred RME contextualized perceived strategy. However, in overall, the RME-Based Perceived Strategies were often preffered by the students. With this result, the researcher concluded that Grade 3 students need the presence of the teacher as they are learning mathematics, and by letting them explore into realistic scenarios with the guidance of the teachers, their mathematics performance will probably improve. Pool et al. (2012), define Guided Practice as teacher and students working together on challenges. Because the teacher directs the learner through the same step-by-step procedure that is described in step-by-step modeling, the practice is directed (Hunt, 2014). To guide students, teachers use specific language and hints. Based on the study of (Karaca et. al, 2017), RME - based activities improved students' numbers and operation unit ability and achievement, by this, we can associate that RME-Based Guided Practice strategy surely improves students' mathematics performance.

Furthermore, according to Fuchs et al. (2005) teachers explicitly relate mathematics concepts and procedures through step-by-step modeling and guided practice. By incorporating this to Realistic Mathematics Education (RME), it reinforce concepts such as place value, teachers can employ tangible hands-on materials or pictorial representations (Bryant & Chavez et al., 2008). Panhuizen (2020) emphasized that RME's goal is to make mathematics more enjoyable and meaningful for students by putting them in situations where they can solve difficulties. RME begins by identifying issues that are relevant to students' lives and knowledge. After that, the teacher acts as a facilitator, assisting pupils in resolving the contextual concerns. This contextualized problem-solving practice is thought to have a good impact on students' cognitive achievement in relation to their mathematical understanding (Bonotto, 2008).

Also, Karaca et al. (2017) stated that RME has produced mathematics curriculum and pedagogy from its inception. According to Clements and Sarama (2013), RME's primary qualities include the formation of meaningful contexts, and the application of meaningful contexts and development model that allows for the transition from contextual to formal mathematics, students' reconstruction of mathematical concepts, student-teacher interaction, and the sense of mathematics as an integrated discipline. These features lead to the progressive mathematical process, which allows learners to correlate problems with contexts, find relevant mathematical ideas, solve problems, and understand solutions in light of their contexts into comprehending contextual difficulties, debating problems, and proposing solutions to problems (Yuwono, 2007). Therefore, it is a good way to apply guided practice in the lens of RME in teaching Mathematics.

4.3 Significant Difference among the different levels of Preference in Learning Mathematics

The test of difference among the different levels of preference in terms of the RME - Based Perceived Strategies was analyzed through the use of F-value and p-value. The interpretations of the difference of the perceived strategies were shown in table 3.

Table 3: Test of difference among Perceived Preference in Learning Mathematics

Factors	F-value	p-value	Interpretation	Post Hoc
Guided Practice	40. 114	0.000 0.000 0.000	Significant	GP & GRM GP & CA GP & IA
Graphical Representation & Manipulatives		0.000 0.041 0.000	Significant	GRM & GP GRM & CA GRM & IA
Collaborative Activity		0.000 0.041 0.008	Significant	CA & GP CA & GRM CA & IA
Individual Activity		0.000 0.000 0.008	Significant	IA & GP IA & GRM IA & CA

*. The mean difference is significant at the 0.05 level.

The table shows that different RME - Based Perceived strategies indeed have different concepts even if they were being contextualized to Realistic Mathematics Education by the researcher. They have its own emphasis particularly as those will be applied in teaching Mathematics. The researcher made questionnaire was all contextualized to Realistic Mathematics Education (RME), however, the concept still vary based on the literal concept of the said perceived strategies, and the respondents responded the survey questionnaire based on their genuine preference. To support this, Pool et al. (2012), define guided practice as teacher and students working together on challenges. Because the teacher directs the learner through the same step-by-step procedure that is described in step-by-step modeling, the practice is directed (Hunt, 2014). To guide students, teachers use specific language and hints.

Moreover, the findings of a meta-analysis by Gersten et al. (2009) corroborate this strategy, identifying five teaching components that appear to be beneficial for students with MD: clear instruction, the use of graphical representations and manipulatives, judicious selection and sequencing of instructive examples, and encouraging students to express their own techniques or the strategies that the teacher has modeled. Meanwhile, it was cited in the study of Olanrewaju (2019), Collaborative learning and activities are best accomplished in a group setting where students can freely engage with one another and collaborate on their ideas. CLS is a type of learning strategy that has evolved over the last thirty years and is still evolving. It promotes a hands-on pedagogical approach to learning.

It promotes a hands-on pedagogical approach to learning. Collaborative learning strategy is a process which two or more people learn or attempt to learn something together (Briandley et al., 2009). Unlike individual learning strategy, people who engage in collaborative learning capitalize on one another's resources and skills, asking one another for information, evaluating one another's work, among other things (Chiu, 2004).

According to Bartz (2015), individualized learning was popular in the 1970s and was supported by many educators as freeing up students to pursue learning and knowledge on their own. Over the last several decades, technological improvements have benefited personalised education by increasing the amount and variety of information available to pupils outside of the classroom. Hence, based on the study of Karaca et al. (2017), RME-based activities not only improved students' numbers and operation unit achievement, but also had a beneficial impact on late-changing affective learning outcomes like self-report. It should be noted that the inclusion of abstract and challenging topics into the context shifted the students' mathematics course self-reports in a negative direction, and that the students' failure to make connections between abstract topics and real-life played a major role in the emergence of this negation.

4.4 Significant Relationship between Mathematics Academic Performance and Perceived Strategies Preference

Table 4 shows the tabulated, analyzed and interpreted degree of relationship between the Mathematics Academic Performance and Perceived Strategies Preference. The Pearson r and p-value were used in determining the relationship.

Table 4: Relationship between Mathematics Performance and Perceived Strategies Preference

Factors	Pearson r	p-value	Interpretation
Guided Practice	-0.181	0.246	Negligible correlation
Graphical Representations & Manipulatives	0.199	1. 201	Negligible correlation
Collaborative Activity	0.110	0.483	Negligible correlation
Individual Activity	0.462	0.002	Significant low positive relationship
Overall	0.310	0.043	Significant low positive relationship

*. Correlation is significant at the 0.05 level (2-tailed).

The Grade 3 students have *satisfactory* mathematics performance, it means that there are still many children struggled in math, particularly problem-solving (Garderen et al., 2006). However, Berch et al.(2007) stated that students must master mathematics because of its importance in the workplace and in everyday life. They must be able to solve problems, as problem solving is essential for the development of human abilities (Subahan 2007). On the other hand, the overall result in getting the correlation of mathematics performance and the level of preference of perceived strategies showed that there is a significant low positive relationship. It means that it is likely that the RME contextualized perceived strategies in learning mathematics as an independent variable affects the dependent variable which is the mathematics performance of the participants. Thus, it is important to know the greatest strategy to teach mathematics where kids will be given meaningful experiences by letting them solve problems that they confront on a daily basis dealing with contextual issues (Abramovich, 2019).

Furthermore, RME's goal is to make mathematics more enjoyable and meaningful for students by putting them in situations where they can solve difficulties. RME begins by identifying issues that are relevant to students' lives and knowledge. After that, the teacher acts as a facilitator, assisting pupils in resolving the contextual concerns. This contextualized problem-solving practice is thought to have a good impact to students' cognitive achievement in relation to their mathematical understanding (Bonotto, 2008). In the study of Karaca et.al (2017), RME-based exercises not only improved students' numbers and operation unit achievement, but also significantly benefited late-changing affective learning outcomes like self-report. It should be noted that the inclusion of abstract and challenging topics into the context shifted the students' mathematics course self-reports in a negative direction, and that the students' failure to make connections between abstract topics and real-life played a major role in their performance.

4.6 Implication of Realistic Mathematics Education (RME) to Education

Mathematics supplies solutions to any situation in the actual world (Laurens, 2017). The formal universe of mathematics, like the wonderful world of fables, can provide a problem-respondent environment as long as it fits into the actual category in students' imaginations (Demirdöen and Kaçar, 2010) stated. Based on the study of Karaca et al. (2017), RME-based activities not only improved students' numbers and operation unit achievement, but also had a beneficial impact on late-changing affective learning outcomes like self-report.

It should be noted that the inclusion of abstract and challenging topics into the context shifted the students' mathematics course self-reports in a negative direction, and that the students' failure to make connections between abstract topics and real-life played a major role in the emergence of this negation (Ozkaya, 2017) stated. The findings of this study showed that the students preferred the most the Guided Practice Strategy being incorporated to Realistic Mathematics Education. Also, the mathematics performance of the Grade 3 students was only satisfactory.

This implies that the teacher should always guide the students and implement guided practice as a strategy and incorporate Realistic Mathematics Education in teaching Mathematics. In this way, the performance of the students might improve. Indeed, the greatest strategy to teach mathematics is to give kids meaningful experiences by having them solve problems that they confront on a daily basis dealing with contextual issues (Abramovich, 2019). Pool et al. (2012), also define Guided Practice as teacher and students working together on challenges. Because the teacher directs the learner through the same step-by-step procedure that is described in step-by-step modeling, the practice is directed and effective (Hunt, 2014) stated.

5. CONCLUSION

The study aimed to determine the mathematics academic performance of the respondents who are the Grade 3 students of BCES, it also aimed to determine the level of preference of the respondents in terms of the RME - Based Perceived Strategies, with this, the significant difference between the levels of preference in terms of the RME - Based Perceived strategies, and the significant relationship of mathematics performance and the RME - Based Perceived Strategies were also aimed to be determined. Based on the gathered results, the statements of the problem are answered.

1. With the 43 Grade 3 students as the respondents, the assessment and the results revealed that their Mathematics Academic Performance is Satisfactory.

2. The level of preference in terms of each RME - Based Perceived strategy was also determined. Among 4 RME - Based Perceived Strategies, it resulted that the Guided Practice is the most and always preferred strategy by the students of Grade 3 in BCES. Moreover, Graphical Representation & Manipulatives, and Collaborative Activity are often preferred by the students. Meanwhile, the Individual Activity is sometimes preferred and the students were neutral when it comes to Individual activities, perhaps they have fear in doing activities alone. Thus, in overall, the 4 RME - Based Perceived Strategies resulted as Often Preferred by the students.

3. It was revealed that there is a significant difference among the different levels of preference in terms of the RME - Based Perceived Strategies.

4. It was determined that there is a significant low positive relationship between mathematics academic performance and the RME - Based Perceived Strategies. Therefore, it implies that the preference of the students in terms of the perceived RME - Based Perceived Strategies to be applied would affect and increase the mathematics performance of the students. However, the mathematics academic performance has a negligible correlation between Guided Practice, Graphical Representation & Manipulatives and

Collaborative Activity. Meanwhile, mathematics performance and individual activity have significant low positive relationship.

5. Out of the results of the study, the researcher has developed and proposed an intervention to improve the level of mathematics performance of the students through having an RME - Contextualized Strategy. Technically, RME- Contextualized Guided Practice Strategy will eventually boost the students' confidence and improve their performance as they will be more guided into realistic scenarios in teaching and learning mathematics. This proposed intervention will provide awareness to the teachers, parents and the students to have a better mathematics performance through Realistic Mathematics Education.

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