

GAME-BASED LEARNING AND PERFORMANCE OF THE GRADE 6
LEARNERS IN MATHEMATICS: AN INTERVENTION PLAN

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Master of Arts in Education
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APPROVAL SHEET

This thesis entitled “*Game-Based Learning and Performance of the Grade Six Learners in Mathematics: An Intervention Plan*”, prepared and submitted by Darline P. Cuizon in partial fulfilment of the requirements for the degree of Master of Arts in Education, major in Administration and Supervision, has been examined and is recommended for acceptance and approval for a Thesis Design Hearing.

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ABSTRACT

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Game-based learning is considered as one of the effective approaches in teaching particularly in mathematics in which most learners found it less interesting and a bit difficult compared to other learning areas. Thus, this study explored on the extent of efficacy of game-based learning as perceived by the learners and the performance of the grade six learners in mathematics as to self- management skills, openness to learning opportunities, and initiative and independent learning in relation to Rapid Mathematics Assessment (RMA) BOSY and EOSY results. It also explored on the profile of the teachers in terms of highest educational attainment, number of years in teaching, and relevant trainings attended. Using a descriptive method of research, the study's findings indicated that there was a significant improvement in learners' performance in the EOSY result of RMA. Likewise, it was found out that the extent of efficacy of game-based learning and the performance of the grade six learners in mathematics had a significant relationship. However, in spite of the significant relationship between the two variables, there were games literacy, and teachers' incognizance of the game-based learning activities. Hence, an intervention plan was proposed to strengthen the utilization of game-based learning in teaching mathematics concepts to increase learners' engagement which later on affecting their performance.

Keywords

Profile of the teachers, Extent of efficacy of game-based learning, Performance of the grade six learners in mathematics, Challenges met, Intervention plan

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Darline P. Cuizon

DEDICATION

I dedicate all of these to our Almighty God, who has bestowed His blessings upon us in our daily lives. Special thanks for providing strength, courage, patience, wisdom, time, and guidance in bringing this study to fruition.

To my children Tyler, Grant, and Olivia Swen and to my husband, Oliver T.

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CHAPTER 1

THE PROBLEM AND ITS SCOPE

This chapter detailed the problem and the reason on why there's a need to investigate the topic. Likewise, operational terms were presented in this chapter and defined in simpler ways for better understanding of the readers.

INTRODUCTION

This section presented the rationale, theoretical background, statement of the problem and null hypothesis, and significance of the study. It described the researcher's major inspiration, which encouraged her to conceptualize this important piece of work.

Rationale

This portion presented the overview of the topic being studied. International and local standpoint on the topic being studied were respectively discussed herein.

According to Bai, et al. (2021), Game-Based Learning has a positive impact on students as it is considered motivating. Because of its positive effects, game-based learning contributes to a variety of learning outcomes in the different educational institutions and is increasingly adopted in various subjects to promote active learning participation and behavioral outcomes (Du, et al., 2021). Moreover, game-based learning encourages cognition and motivates learners' interest in learning especially in Mathematics, that leads to cognitive learning outcomes that result in improved performance (Bai, et al., 2021).

In global perspective, Krath et al. (2021), in Germany revealed that Game-Based Learning is useful for the designing Mathematics activities like addition, subtraction, multiplication, and division. Considering that technology continues to dominate in the field of teaching, the use of games has been in demand and constantly changing the learning interests of the students (Vanduhe, et al., 2021).

Likewise, in Washington, Froehling (2022), investigated 57 studies that compared teaching with a game to using other instructional tools and found out that games provided the greatest benefit and boost engagement to lower-performing students. Playing games with design additions informed by learning theory outperformed students playing standard versions of the same game (Froehling, 2022).

Furthermore, Debrenti (2024), in Romania, reported that most of participants enjoyed working both with the cards and with digital games. The games were important in developing high students' engagement in solving tasks. Thus, whether using cards or digital tools in games, both enhances students' participation like in problem solving.

In local viewpoint, Sulpico, et al., (2025) of Cebu Normal University explored the use of game-based learning in improving Mathematics performance of grade seven learners. It was found out that the findings showed a statistically significant increase in post-test scores and generally positive affective responses. Game-Based Learning was found to encourage participation, students' enjoyment, and achievement in Mathematics.

Also, Orbon and Sapin (2022), evaluated the effectiveness of Game-Based Learning in teaching Mathematics at Cabuyao, Laguna. Using the paired sample t-test, mean scores during the pre-test and post-test differed statistically and showed that game-based instruction assisted students in enhancing their interest in solving mathematical problems, thus improved their performance in Mathematics.

However, according to Talandron- Felipe (2026), the Philippines' education is not that updated in using Game-Based Instruction. While there are few educators who are implementing Game-Based Learning teaching the learning area, barriers such as digital divide and lack of teachers' training, hinder the full adoption of Game -Based Instruction.

The Department of Education envisions to develop learners who are globally competitive, which further implies that learners must be academically prepared with absolute skills and knowledge. DepEd Lapu-Lapu City wherein the researcher belongs, aims to provide academic excellence to its learners. Thus, using various strategies in teaching particularly in Mathematics entails creative and innovative skills of the teachers on how to deliver the lessons. Teachers have much emphasis of the learners' growth and development. Hence, it is for this end that the researcher is encouraged to explore the efficacy of using Game-Based Learning and assess on how it affects the performance of the grade six learners in Mathematics. At the same time, the researcher wanted to investigate the difficulties or barriers that teachers may have encountered in using Game-Based Learning. Thus, the findings of this investigation will serve as the basis in designing an

intervention plan that will further promote the efficacy of using Game-Based Learning to improve performance of the learners in Mathematics.

Theoretical Background

This study is anchored on the policies and theories that highlights the relevance of using Game -Based Learning in improving the performance of the learners in Mathematics. This section examines the several legal background and theories that will give support on why there's a need to conduct this research and are arranged based on its relevance to the study.

Legal bases. The researcher has organized the connected legal basis according to its degree of importance in relation to the study conducted such as: Minecraft Education Edition Professional Development Cohorts, (DM- CT- 113, 2023), Rapid Mathematics Assessment [RMA] to Key Stage 2 Learners, (DO 18, 2025), and Learning Action Cell Professional Development Strategy, (DO 35, 2016).

This study is mainly anchored on *Minecraft Education Edition Professional Development Cohorts, (DM – CT- 113, 2023)*, which capacitated the teachers on using the basics of Minecraft Education Edition learning pathways. This is a version of the popular game Minecraft designed for education spaces, specially a classroom setting. It allows teachers to offer a fun and interactive delivery of lessons to their students of all ages through Game-Based Learning.

Minecraft Education Edition as a strategy in learning is important because it can provide several benefits for students which include engagement, active learning,

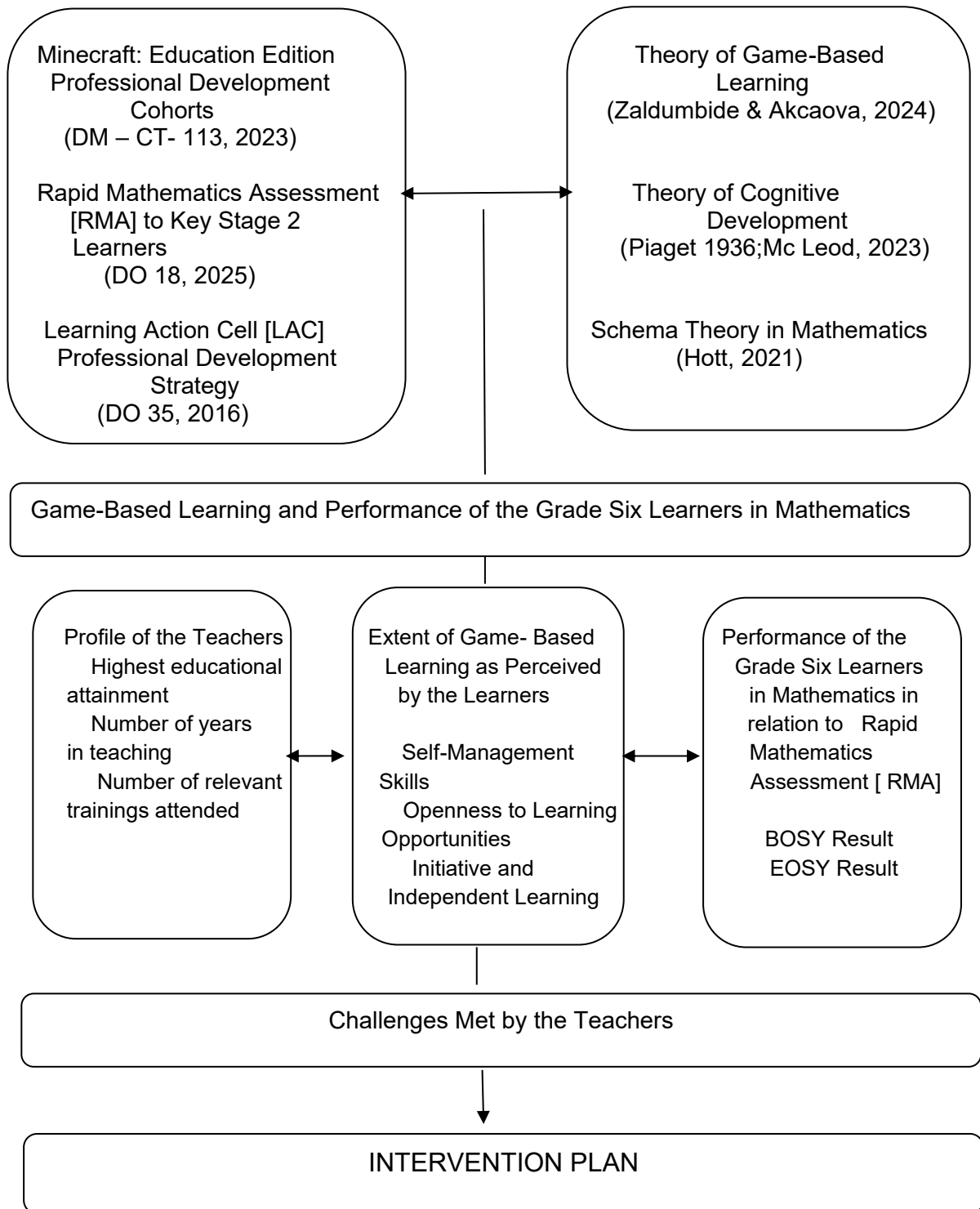


Figure 1: Schematic Diagram of the Theoretical Background

problem-solving and critical thinking, collaboration, feedback, real-world application, adaptability, and fun.

Game-Based Learning are inherently engaging and can help to hold students' attention, making them more likely to stay focused and motivated to learn. Since games often require students to actively participate make decisions, rather than passively receiving information, their problem-solving and critical thinking skills will be developed. Likewise, games foster collaboration and encourage students to socialize their peers with respect (DM- CT- 113, 2023).

Furthermore, using games like the Minecraft Education Edition provides an innovative and effective way for students to learn and develop essential skills. Its potential as an educational tool is vast, and it can teach wide range of subjects, foster creativity and critical thinking, and promote teamwork and communication (DM-CT, 113, 2023).

Another anchorage of this study is the *Rapid Mathematics Assessment [RMA] of Key Stage 2 Learners, (DO 18, 2025)*, reminds every teaching personnel that DepEd is steadfast in its commitment to ensuring that learners' interventions are provided at the right level, and that no learner is left behind. To this end, the Rapid Mathematics Assessment [RMA] shall be administered to all Grades 1 to 3 learners nationwide, ensuring coverage across every public school in the country.

At the core of RMA lies the objective of determining the numeracy and mathematical profiles of students in grade one to three. The insights gained from this assessment will serve as invaluable tools for identifying grade readiness and

skills requiring improvement and will help teachers design intervention activities for this school year.

“RMA is co-developed by DepEd’s Bureau of Learning Delivery, ABC+, and University of the Philippines National Institute for Science and Mathematics Education Development (NISMED) “, (DO 18, 2025).

Furthermore, the gathered data of RMA administration will enable the DepEd to champion educational equity by assessing learner performance across all regions and providing targeted support where it is most needed.

Lastly, this study is banked on the *Learning Action Cell [LAC] Professional Development Strategy*, (DO 35, 2016), which stressed out that successful teaching is a result of systematic use of appropriate strategies for delivering and assessing the learning objectives targeted for each lesson. Through LAC sessions, 21st century skills and ICT integration are given focus. Bringing 21st century skills into the teaching and learning situation is the central feature of the education curriculum.

Curriculum contextualization is the process of matching the content and instructional strategies relevant to learners. Students require that teachers always consider individual differences in planning and implementation of learning activities. Teachers identify and respond opportunities to link teaching and learning in the classroom to the students’ experiences, interests, and aspirations of the wider school community (DO 35, 2016).

Deepening curriculum contextualization through games and indigenized materials are essential for communities that have cultural practices that reflect the practices of the majority of the people.

Summing it up, all the cited legal bases provided a stronger foundation for this study. Moreover, it emphasized why game-based learning must be adopted in the teaching-learning process. Whether, it is the traditional game or digital game, both encourage active participation and engagement of the learners.

Theories. This research study is drawn from insights that give scientific explanation about the topic being studied. Similarly, this section details the theories used in this study such as: Theory of Game-Based Learning,(Zaldumbide & Akcaova, 2024), Piaget's Theory of Cognitive Development,(McLeod, 2023), and Schema Theory in Mathematics, (Hott, 2021).

Primarily, this study is mainly anchored on the *Theory of Game -Based Learning*, (Zaldumbide & Akcaova, 2024), which posits that games must be integrated into the educational content as it leverages game mechanics, challenges, feedback and competition. Using games enable learners to construct knowledge through experience and interaction. Games keep learners in a state of deep focus and engagement where the challenge level perfectly matches the player's skill level.

Learning occurs through action, reflection, and immediate, contextualized feedback, allowing for trial -and -error in a safe and motivating environment. Game-Based Learning increases motivation, interest, and curiosity. Instant, relevant

responses to actions, allowing for quick correction and skill development are obvious in using games (Zaldumbide & Akcaova, 2024).

Safe practice, experiential learning and interaction are the pillars upon which the theory of game-based learning stands. Learning through games allows students to experiment in non-threatening scenarios and acquire knowledge through practice and social interaction both with the environment and their peers (Zaldumbide & Akcaova, 2024).

Another theory that is banked on this study is the *Piaget's Theory of Cognitive Development*, (McLeod, 2023), which explains how a child constructs a mental model of the world. He believed that cognitive development is a process which occurs due to maturation and interaction with the environment. Children's ability to understand, think about, and solve problems in the world develops in a stop-start, discontinuous manner (rather than gradual changes over time). Thus, the goal of this theory is to explain the mechanisms and processes by which the infant, and then the child, develops into an individual who can reason and think using hypotheses. According to Piaget, children are born with a very basic mental structure (genetically inherited and evolved) on which all subsequent learning and knowledge are based. Schemas are the basic building blocks of such cognitive models and enable us to form a mental representation of the world, (McLeod, 2023). Piaget defined a schema as: a cohesive, repeatable action sequence possessing component actions and governed by a core meaning."

"Piaget also believed that a child developed because of two different influences: maturation, and interaction with the environment. The child develops

mental structures (schemata) which enables him to solve problems in the environment. Adaptation is the process by which the child changes its mental models of the world to match more closely how the world is" (McLeod, 2023).

Finally, this study is anchored on *Schema Theory in Mathematics*, (Hott, 2021), which defined schema as a word problem -solving strategy that teaches students to identify problem types by focusing on the underlying structure of the mathematical situation. In *Schema Theory*, students are explicitly taught three problem structures for additive problems (i. e., requiring addition or subtraction) along with the core characteristics of each structure. Elaboration knowledge requires students to schematically map the information presented in the word problems to the core features of the identified problem type.

Moreover, schema theory is an organized, structured unit of knowledge. It enables student to think faster and understand mathematical problems easily. It uses existing knowledge to connect the new lessons to understand how it is related. Fitting new experiences into existing schemas develops students' mathematical ability. Further, schemas are units of understanding that can be hierarchically categorized as well as webbed into complex relationships with one another. It underscores cognitive structures and processes for individuals to organize, interpret, and store information. In addition, it offers a more comprehensive cognitive framework elucidating how individuals organize, process, and interpret information from their environment. Schema activation occurs when a relevant schema is brought to the forefront of cognitive processing (Hott, 2021).

In conclusion, all the theories mentioned gave this research a scientific and reliable basis that game-based learning plays a crucial role in teaching various learning areas that provided opportunities to every learner to freely think, explore, humbly accept corrections and feedback, and mingle with peers well. Likewise, these theories emphasized that learning does not happen right away, yet, it needs innovation and creativity of the teachers for the learners to easily grasp the lesson specially in mathematics.

THE PROBLEM

This study determined the level of efficacy of Game-Based Learning and on how it affected the performance of the Grade 6 learners in Mathematics at Gun-ob Elementary School, Division of Lapu-Lapu City, Cebu during the school year 2025-2026. Hence, results of the study served as bases in designing an intervention plan.

Statement of the Problem

Specifically, the study sought to answer the following queries.

1. What was the profile of the teachers in terms of:
 - 1.1. Highest educational attainment;
 - 1.2. Number of years in teaching; and
 - 1.3. Relevant trainings attended?
2. What was the extent of efficacy of game-based learning as perceived by the learners as to:
 - 2.1 Self-management Skills;

- 2.2 Openness to Learning Opportunities; and
- 2.3 Initiative and Independent Learning?
- 3. What was the performance of the grade six learners in Mathematics in relation to Rapid Mathematics Assessment [RMA] as to:
 - 3.1 Beginning of School Year [BOSY] Result; and
 - 3.2 End of School Year [EOSY] Result?
- 4. Was there a significant mean difference between RMA BOSY and EOSY results in the performance of grade 6 learners in Mathematics?
- 5. Was there a significant relationship between the extent of efficacy of game-based learning and the performance of the grade 6 learners in mathematics?
- 6. What were the challenges met by the teachers in utilizing game-based learning?
- 7. Based on the findings of the study, what intervention plan could be designed?

Statement of the Null Hypothesis

This section provided the null hypotheses of the study. The statistical treatment was tested at 0.05 level significance.

Ho₁: There was no significant mean difference in the performance of the grade 6 learners in Mathematics in relation to RMA between BOSY and EOSY results.

Ho₂: There was no significant relationship between the extent of efficacy of game-based learning and performance of the grade 6 learners in Mathematics.

Significance of the Study

This research would be significant in the field of teaching addressing the identified gaps in the use of game-based learning in enhancing performance of the learners in mathematics. This study was beneficial to the following: Department of Education officials, learners, school heads, teachers, community, researcher, and future researchers.

Department of Education Officials. By providing data on game-based learning and performance of the grade 6 learners in mathematics, insights could be gained to inform the development of standards and frameworks used to evaluate against the targeted competencies in reading literacy. Additionally, identifying competency gaps through the ratings assessment would be the basis of our DepEd officials in designing support programs, allocating resources, and implementing initiatives tailored specifically to teacher's needs for professional development.

School heads. School heads stand to benefit greatly from reflecting on the competency target garnered in this research. Recognizing competency gaps through the ratings assessment would guide our DepEd officials in designing support programs, allocating resources, and implementing initiatives tailored specifically, initiate school programs in intensifying the use of game-based learning that in turn helped develop the performance of the learners in mathematics.

Teachers. Teachers in public schools would significantly benefit from this study. Through identifying the competency gaps by means of the ratings assessment, teachers would be guided on what intervention programs, projects,

or activities to be undertaken to further improve the performance of the learners in mathematics while utilizing game-based learning in teaching mathematical concepts.

Learners. The learners as the main respondent of this study greatly benefited from this research. By implementing the proposed intervention plan, learners who were low -performers in mathematics would be given time to learn the lesson in accordance with their pace of learning and interests.

Community. The community would benefit tremendously through optimized partnerships between schools and stakeholders like parents and local organizations. Presenting advocacy bases to highlight infrastructure, curricular, and program needed decision-makers in cultivating support to the educational process in school.

The researcher. Conducting empirically grounded local studies enabled current researchers to engage meaningfully in evidence-based policy dialogues and advance the overall body of knowledge on reading literacy topics in the Philippines. The research design, methodologies, and lessons learned through this process strengthen the ability to design and implement rigorous investigations. Disseminating novel insights regionally maintains the field's dynamism by sparking new conversations important to scholars. Most importantly, output from this study would significantly guide the researcher to provide intervention programs and activities that will cater the diverse learning needs.

Future researchers. Serving as an initial baseline for future researchers, the findings and recommendations of this study would facilitate subsequent related

studies that build on its work. It guided deeper exploration of topics like exploring the efficacy of game – based learning and its impact on the performance of the learners.

DEFINITION OF TERMS

This section explained the basic and important terms that were used in this study. Thus, it was operationally defined for better understanding of the readers in the following terms: challenges met by the teachers, extent of efficacy of game-based learning, intervention plan, performance of the grade six learners, and profile of the teachers.

Challenges met by the teachers

This depicted the barriers and difficulties that teachers have encountered in utilizing game-based learning in improving the performance of the grade 6 learners in Mathematics. Through identifying these barriers, it would be noted on what specific barrier highly hindered.

Intervention plan

This referred to the expected output of this study. Likewise, it specified the area of concern, activities/ strategies to be undertaken, time frame, persons involved and budgetary requirements.

Performance of the Grade Six Learners

This reflected on the ability of the grade six in mathematics in relation to the Rapid Mathematics Assessment [RMA], which is a standard tool used to assess

mathematical performance.

RMA BOSY result. This term was the result of the assessment conducted at the beginning of the school year.

RMA EOSY result. This concept was the result of the assessment conducted at the end of the school year.

Profile of the Teachers

This phrase referred to a set of demographic and professional characteristics that described the background data of the teachers as to: highest educational attainment, number of years in teaching, and number of relevant trainings attended.

Highest educational attainment. This term referred to the highest education that the teachers have achieved.

Number of years in teaching. This phrase referred to the length that the teachers have served in DepEd.

Number of relevant trainings attended. This statement referred to the trainings that teachers attended relevant to the topic being studied.

CHAPTER 2

RELATED LITERATURE AND STUDIES

Several literature and studies were reviewed and specifically discussed in this chapter. This chapter cited literature and studies taken from authors or researchers around the globe, including the Philippines.

RELATED LITERATURE

The review of various related literature was presented in this section, citing foreign and local authors. With this review, it provided a stronger claim on the topic being studied and provided new findings and insights that were relevant in utilizing game-based learning and performance of the learners particularly in Mathematics.

Foreign

The review of related literature from foreign sources gave the researcher various pieces of information of what was currently known about the topic in a context outside the Philippines. This review gave an assurance that the researcher was familiar with the current developments in the topic from around the world thereby, establishing a novel research study.

Benefits of game-based learning in education. Nisbet (2024z) articulated some benefits of game-based learning in education. Games can positively impact things like students' math and language learning in many ways. Game-based learning can help students develop their critical thinking skills and be able to reason things out. These skills easily translate into ones they can use in life outside school.

Also, it can help students collaborate with others and reflect on their own past experiences. Moreover, game-based learning impacts special education needs in the classroom, as it guides instruction, creating a positive environment.

Kinds of game-based learning in elementary mathematics. As explained by Greenfield (2023), game-based learning was divided into two main game categories: traditional games and digital games. Both traditional games and digital games must be integrated in teaching mathematics, depending on the availability of resources, time and facilities. Whatever kind of game, elementary mathematics must be fun, thus using games reduces anxiety of the learners and motivates them to participate actively in the lesson (Avdiu, 2020). This is in consonance with Chen and Zhao (2022), who stated that gamified features of a game include competitions, collections, rankings, non-player, characters, or coins and badges.

Likewise, Zhang, et al. (2020), stressed that mathematics teaching using traditional games is not obsolete yet it is classical. Although learners are not typically engaged, it still helps making the lesson easier to understand.

Examples of game -based learning. Nisbet (2024) cited some examples of game-based learning such as: card games, board games, simulation games, word games, puzzle games, video games, and role -playing games (RPGs).

1. *Card games.* Using cards in teaching math is a bit classic yet stills ignite learners' interest in learning math concepts. Card games use a game-specific deck of cards (Nisbet, 2024).

2. *Board games.* Board games are played on a board that usually involves the movement of pieces. Chess, DaMath, and checkers are popular ones (Nisbet, 2024).

3. *Simulation games.* These are designed to closely stimulate real-world activities. Simulation games can teach about solving word problems and many more real life process.

4. *Word games.* Word games are typically designed to explore the properties of language and can be integrated in teaching mathematics.

5. *Puzzle games.* Puzzle games emphasize puzzle solving through one's use of things such as logic, word completion, sequence solving, as well as spatial and pattern recognition like Soduko.

6. *Video games.* Video games are electronic games where players can manipulate what appears on the screen with, for example, a joystick, controller, or keyboard.

7. *Role -playing games (RPGs).* RPGs are games in which players assume the role of imaginary characters who engage in adventures.

Game-based learning in mathematics education suits Gen-Z learners. In an article of Hidayat, et al. (2024), it is emphasized that games particularly in secondary school kids are mostly embraced. It includes characteristics that make students potentially challenged, ignite curiosity and fantasy, considering that Generation Z learners are more inclined into technology. These learners want themselves to be engaged and learning at the same time. Thus, Game-Based Learning plays an important role in teaching mathematical concepts.

However, Moon and Ke (2020), said that multitasking has been detrimental to learning for most Gen-Z learners. When students are tasked with carefully assimilating new information within a mathematics' game , increased interaction outside the game may lead to distractions due to the split-attention effect.

The teachers' role in game -based learning. Greenfield (2023), highlighted that the access teachers have to students' progress impact the teachers' role positively and negatively. If teachers have access to students' progress, then the teachers can easily adapt the curriculum to meet students' needs. But teachers will have limited interactions with students to give feedback and assess learning during the gameplay. Teachers' role as moderators in game-based learning is an important factor in the effectiveness of integration and increasing conceptual

understanding. Thus, “teachers build stronger relationships with students, invest more in students’ learning and can modify game in progress to include more questions or mini-games for students to interact with and strengthen conceptual knowledge” (Greenfield, 2023).

Effectiveness of game-based learning in learners’ performance in mathematics. Dan, et al. (2024), cited that the rapid growth of technology has been changing every aspect of human living, more importantly shaping the way how teachers teach and how students learn. The use game-based learning is a motivating, attractive, and engaging approach that helps teachers teach math lessons effectively, and makes students learn faster and better. Hence, Game-Based Learning provides a motivational environment, enhances student learning (Hussein, et al., 2022).

Theobald (2024), defined game-based learning as an active learning approach to teaching that utilizes physical or digital games to directly teach students different concepts or skills. Through common game elements like competition and collaboration, game -based learning seeks to impact important knowledge and stimulate real-world experiences through the explorations of various games (Pan & Ke, 2023). There is a casual link between active learning and increased student engagement. For this reason, games could help to promote active learning and could prove beneficial for adopting an entirely new teaching approach revolved around games and their applications. These are important as they reinforce the task at hand by connecting targeted supports to different learning targets and concepts. This meant to reduce the cognitive load on students in

complex game environments to prevent them from getting stuck or feeling frustrated while playing the game (Pan & Ke, 2023).

Furthermore, according to Chen, et al. (2023), one of the biggest problems with mathematics education today is a lack of motivation and engagement among adolescent students. Thus, utilizing game-based learning is one of the ways to increase students' engagement in mathematics.

Challenges in the implementation of game-based learning. Yaman, et al. (2024), stated that games are vital for social interaction, personal growth and development. However, even though games have many potential benefits, there are also some challenges that need to be taken into account. These barriers include behavioral and attitudinal barriers; school policy barriers; material and technology barriers; and barriers related to game literacy.

Also, Jääska and Aaltonen (2022), cited that the perceived challenges of game-based learning for students manifest as increased cognitive load and stress. Challenges for teachers usually cause negative consequences for students. For students, game-based learning may be time-consuming, and game session durations can be difficult to predict.

Moreover, Harding (2023), stated that games aren't always beneficial to the curriculum. Learning is not going to take place if the subject matter is relevant but the game itself is too easy or far too complex for the learners to play. Another factor to consider is the availability of tools and equipment. Tools and equipment can be costly, thus finding an appropriate game may incur costs- digital games require electronic equipment which can be expensive and many games will require internet

access to be able to play them which is another cost to factor in. Likewise, traditional games are not cost-free-card games and board games can often be even more costly to buy.

Lastly, Hung Lai and Yi Hu (2025), stated that introducing game-based learning into formal education is undoubtedly a challenging task. These challenges stem from multiple dimensions, including teacher competence, curriculum design, implementation strategies, and assessment mechanisms.

Local

The review of related literature from local sources provides the researcher an excellent perspective of what is currently known about the topic within the Philippine setting. This review guides the researcher in adding something new to the field of study within the country without duplicating previous efforts.

Leveling up mathematical skills through game-based learning. Cayang and Ursabia (2024), highlighted that numerous fields rely on mathematics as an essential tool worldwide. Not only as a subject taught in schools, but it also serves as playground for learners as a challenging subject that can be regarded as everyone's modern -day survival kit. When games are encouraged in a classroom setting, teamwork and contact will be developed, and, math anxiety will be reduced. Thus, when students' math anxiety is reduced, they will develop a positive attitude towards mathematics making them feel confident in learning mathematics that may turn into an improved performance.

Furthermore, Paglomutan (2024), pointed out that utilizing game-based strategies in learning mathematics in the junior school helped students'

performance improved. “Test performance that allowing them to recall concepts learned and skillfully solve problems from the different activities they experienced with the use of game – based strategies were helpful. Mathematics is an essential subject taught in elementary and secondary education that gives learners the basic information and abilities they need to manage their life (Ariyanti & Santos, 2020).

Lastly, Rosil and Elpidang (2025), cited that mathematics is not loved by most students. Some considers it as a boring and burden subject. This is one of the factors that contributes to the low performance in mathematics. Critical thinking and problem-solving skills encompass mathematics concepts. Thus, teachers’ role is necessary in increasing learners’ performance. “Game-based learning in mathematics is a technique that creates a balance between classroom learning and educational games while enhancing the efficiency of learning through student-centered learning activities” (Rosil & Elpidang, 2025).

Game-based learning in mathematics affects affective domain of the learners. Jaranilla, et al. (2024), cited that one of the positive influences of game-based learning is its impact on the affective domain of the learners, including increased motivation, engagement, enjoyment, and positive attitudes towards mathematics learning. In the same vein, Lasala Jr. (2024), stressed that game - based learning intervention in mathematics is associated with an increased level of intrinsic motivation among students, leading to greater persistence and effort in learning task.

Game-based as teaching strategy. Cruz (2023), highlighted that game-based activities have emerged as a popular strategy across various subjects

including Mathematics and Chemistry. This approach involves the use of computers or traditional games that utilize different methods to teach mathematical concepts, and also in Chemistry.

“The application of game-based activities as teaching strategy for Chemistry is supported by the Philippine Constitution’s provision for the state to promote and protect the right of all citizens to quality education at all levels”, (Cruz, 2023). Integrating game-based activities can effectively tackle the recurring problem of disinterest and insufficient comprehension of Chemistry among students in numerous academic institutions (Cruz, 2023).

Likewise, Joaquin and Imbat (2024), entailed that game-based learning plays a crucial role not only in mathematics but also in reading. Reading is a fundamental skill that is crucial to a child’s education just like mathematics. However, like mathematics, many students consider reading as a difficult and boring subject. Thus, integrating game -based learning activities in teaching reading may improve the students’ performance. The use of game-based reading strategy enhances the reading level of the learners. It is also adopted from the viewpoint of a game-based learning which is believed to be effective (Joaquin & Imbat, 2024).

The use of game -based learning in pedagogy seeks to enhance student engagement and motivation, and ultimately improve performance. It is adopted to make sure that they contribute to the best solution for teaching (Joaquin & Imbat, 2024).

Moreover, Magpusao (2024), cited that play 's role in children 's learning is important, necessitating the effective teaching methods that boost engagement. With the improvement of technology, new concepts and strategies emerge such as integrating play and learning in order to enhance the learning experience of the students. Simultaneously, game-based learning has emerged as a distinct approach that develops games, specifically designed for educational purposes. It targets in the development of knowledge, skills, or objectives to learners.

Games are used in various subject areas in order to promote improvement in motivation and engagement and contributes to learners' motivation, efficacy, self-determination, career motivation, and grade motivation of learners (Magpusao, 2024).

Rapada Jr. (2024), stated that there has been a growing need to re-evaluate traditional pedagogical methods and embrace more innovative approaches to teaching and learning. Traditional methods like textbooks, lectures and discussions may not consistently engage students and meet their diverse learning preference. To keep pace with fast-growing society, enhancement in the field of education is necessary. This involves enhancing teaching strategies and techniques, learning materials, and overall classroom management. Thus, "one such innovative pedagogy that has garnered global attention is game-based pedagogy. Game-based teaching diverges from traditional educational methods by integrating games as a primary instructional tool. It entails modifying games to cater the learning gaps in any subject areas as it fosters peer and social interaction, decision -making, and problem-solving skills" (Rapada, 2024).

“By integrating educational games that cater to the preferences and needs of both teachers and students, the teaching and learning process can be enhanced and more successful and that utilizing game-based learning with indigenous instructional materials can be an effective approach to enhancing students’ comprehension and academic performance “(Rapada, 2024).

Equipping educators for game-based teaching using Minecraft. An educational news from Ateneo De Manila Edu News (2023), reported that the Ateneo Laboratory for the Learning Sciences (ALLS), through its project *Interest in STEM among Filipino Learners using Minecraft* funded by the Department of Science and Technology [DOST] was able to conduct four training sessions in total- two online and two on-site training sessions- for basic education teachers that focused on module development using the What- If Hypothetical Implementations in Minecraft (WHIMC) worlds. This capacitates teachers from Grade four, five, and six to enhance their knowledge and skills in Minecraft Education Edition [MEE].

Game-based learning tools in teaching. Abulencia and Dolendo, PhD (2024), denoted that the implementation of game-based learning all over the world varies from different geographical locations. While game-based learning is still relatively uncommon or only used in specific subject areas or with certain age groups in some places, it is actively encouraged and integrated into curricula.

“Game-based learning refers to the use of games and play-like elements in learning environments to enhance learning outcomes. This approach involves integrating games and game design principles into educational contexts to make

learning more engaging, interactive, and effective. Gadgets like cellphone, laptop, desktop, television, projector, camera, printer, and pocket wifi are commonly used game-based learning tools in teaching (Abulencia & Dolendo, PhD, 2024). Game-based learning is compelling because it expresses information through doing rather than telling. Through game-based strategy, the learning environment becomes active, thus creating a positive competitive environment- the chance for team play encourages individuals to strive for their best and use teamwork to achieve more.

Digital game-based learning and mathematics achievement of learners.

Yumang (2024), stated that play is a very common, fun and complicated experience to human beings, in both young and adults. Game-based learning is defined as any activities that have a game at their core, either as the main activity or as a stimulus for other related activities, and provide learning as a desired or incidental outcome. The use of digital games has positively impacted the mathematics achievement of learners in terms of problem-solving involving conversion units of measurement, patterns and algebra, and addition and subtraction of polynomials, and other competencies in Mathematics. Through integrating digital-games, students feel motivated and engaged.

However, Donato, et al. (2024), explained that children of today's generation are more inclined to digital games, resulting to lesser interest and no love for learning native sports. "The factors that affect the Filipino citizen to have less interest in playing Philippine native sports are cultural onslaught of western

countries which has brought about change in the lifestyle and attitudes of people in tribal societies where native sports are in mostly vogue”, (Donato, et al.,2024).

Synthesis

This portion presented the combined ideas of the reviewed literature from foreign and local sources about game-based learning performance of grade 6 learners in mathematics. It highlighted similarities and differences and trends across investigations around the globe.

Summing all the reviewed literature from both international and local point of view, it highlighted the importance of game-based learning in the field of education considering the rapid growth of technology and the notable preferences of the learners nowadays in terms of their needs and interests. As explained by several authors, integrating games in pedagogy does not only helps learners develop self-confidence, but also motivates learners to be more determined and competitive. Also, most authors believed that utilizing game -based learning activities is a more innovative and upgraded approach in teaching not just in mathematics but in other learning areas as well.

However, despite the benefits that games have contributed in the course of teaching-learning process, there are some disadvantages being noted by several authors such as: time-consuming, high cost of materials whether in digital games or classic games, and unclear feedback. But, in spite of these barriers, game-based learning is attributed to the increased performance of the learners not only in Mathematics but also in other subjects like Reading and

Chemistry. Hence, all over the world, game-based learning is acknowledged as an intervention that could help cater the learning gaps.

RELATED STUDIES

Reviewing related studies helped the researcher understand the topic under study better for it clarified vague points about the problem. It also guided the researcher in making comparisons between her findings and the findings of other similar studies. By going through enough number of reviewed materials paved the way to new insights and perspectives about the recent trends of the research problem, thereby providing the researcher with fresh and up-to-date ideas in coming up with inferences, conclusion, and recommendations.

Foreign

The review of related studies from foreign sources provided the researcher the perspective of the global contexts. It enabled her to look at her study in the lens of the global arena. On this note, it made the study even more meaningful and relevant in the current times for it considered not only the local setting, but the whole world in the greater scale.

Game-based learning helps learners practice mathematical patterns and structures. Lozano, et al. (2023) in Mexico, developed a game-based mobile application to help learners practice mathematical patterns and structures. The result of the study showed that the application has fully achieved all its intended features and received positive evaluations from students and IT experts. The study used the concepts of snakes and ladders paired with questions and answers about

mathematical patterns and structures. A dice can be rolled every time the user wants to proceed with the game and continue answering the questions. It is concluded that “the integration of game -based learning principles and approaches based on the Octalysis framework was also achieved based on the initial evaluation of the application” (Lozano, et al., 2023).

Efficacy of game -based learning in modern education. A study of Wardoyo, et al. (2020) at Universitas Negeri Malang concluded that game-based learning has significantly adapted to student interests and conditions, and its outcome has a positive impact on the students’ performance. Moreover, it is concluded that “the use of game -based learning model is effective enough to improve student learning outcomes. Meanwhile, the use of conventional methods in teaching is effective to improve students’ learning outcomes in microeconomic and macro subjects” (Wardoyo, et al., 2020).

Similarly, Al-Khayat, et al. (2023), explored the effectiveness of Game-Based Learning at Middlesex University, Dubai. The study found that game-based learning leads to increased motivation, engagement, and cognitive skill development in students. Through the creation of an immersive and interactive learning environment, games foster problem-solving, critical thinking, and collaboration skills. Further, it is concluded that game-based learning has greatly impacted in enhancing students’ motivation and cognitive skills (Al -Khayat, et al., 2023).

Furthermore, it is recommended in the said study that instructors should consider incorporating game-based learning as a key component of their

instructional strategies to enhance students' motivation and cognitive skills. These include selecting appropriate games, aligning the games with the learning objectives, and providing support throughout the learning process (Al-Khayat, et al., 2023).

Another study in India conducted by Rajan (2022), revealed that the application of game -based learning both digital and traditional games has increased the engagement of the students in the learning process. It is also indicated in the study's result that "one of the most significant benefits of game-based learning is visualization "(Rajan, 2022). Moreover, it is affirmed that game -based learning can enhance students' knowledge in a particular subject and has helped increase social cohesion and social interaction (Rajan, 2022).

Also, in Kazakhstan, Alipova, et al. (2024), revealed in their study that game-based learning enhanced memorization of computer science terminology and motivation among primary school students. Findings of the study further showed that the incorporation of gaming elements in learning seemingly catalyzes cognitive processes essential for memory retention, aligning with the cognitive theory of multimedia learning.

In the same vein, it is evident that game-based learning has a significant positive impact on both the memorization and motivation. In addition to, it is indicated in the study's findings that an increased level in motivation was evident in experimental group exposed to game-based learning compared to the control group that followed traditional teaching methods like lectures and textbooks.

Lastly, an investigation of Hafeez (2021) at Pakistan, showed that game-based learning strategy proved to be highly effective learning strategy in numerous disciplines under different learning environments.

Game-based learning and student achievement. Karakoc, et al. (2022) at Turkey, revealed the effect of game-based learning on student achievement through a meta-analysis method. Game-based learning environments were scrutinized within the context of experimental and control group pre-test post-test results. As a result of the investigation, it was determined that there was no publication studies in terms of publication bias.

In addition to the analysis for the determination of overall effect size on student achievement, sub-group comparisons according to the level of schooling, publication type, and different discipline were also performed within the scope of the study to identify the source of heterogeneity among the findings. As a result, it was concluded that the level of schooling (pre-school, primary school, secondary school, high school, university) did not yield a significant change for the effect of game-based learning on student achievement (Karakoc, et al., 2022).

Factors affecting educators to implement game-based learning. In the study of Ward (2022), it is proven that understanding the benefits of game-based learning activities as instructional tools is an essential contribution. Some of the factors that need to be considered by educators as resulted in the study of Ward (2022) are: educator needs to perceive the innovation of games as having value and providing them with an advantage by choosing to implement them in their classroom. Other factors being explored and resulted in the study are: teacher

acceptance of game-based learning as an instructional tool; teacher perceptions of game-based learning; teacher perceived barriers to implementation; teacher game-based technological and pedagogical content knowledge.

Influence of game-based learning on primary students' learning outcome.

A study in Nigeria conducted by Ezeoguine (2021), explored the pupils' perceptions /acceptance based on the incorporation of the game into science learning. A one-group pretest-posttest design was used with 18 primary five and primary six pupils from a single primary school. A pilot test was administered to twenty students. Reliability analysis of the pilot test results was = 0.84 and four items in attitude towards usage, and =0.66 and three items in perceived ease-of-use, =0.78 and four items in attitude towards usage, and = 0.63 and three items in intention to use. The pupils revealed positive attitudes toward the use of educational games in science learning. The result also established that educational card games help to motivate and improve the pupils' science knowledge (Ezeoguine, 2021).

However, study of Adipat, et al. (2021) at Thailand concluded that the advantages of adding game-based learning to the classroom far outweighs its disadvantages. For games to be educational and aid students, they must focus on the content to clarify and highlight hypothetical models and should therefore developed by scholars and teachers and be based on good academic philosophies.

Game-based learning improves critical thinking and knowledge sharing of learners. According to the study of Katual, et al. (2023) at the Republic of South

Africa, that the choice of game element depends on the desired skill development, knowledge sharing or critical thinking skills, and the specific learning objectives. It is recommended in the said study that “incorporating elements of competition and collaboration into the game design to motivate participants to actively engage in knowledge sharing is necessary” (Katual, et al., 2023). Likewise, providing clear objectives and rewards within the game that encourages players to seek out and share valuable information with their peers is another thing to consider.

Also, Ti (2025), revealed that high degrees of engagement in behavioral, emotional, and cognitive spheres were found by quantitative results. Complimentary qualitative data provided insightful analysis of students’ game-based learning experiences, stressing higher enjoyment, drive cooperation, conceptual understanding, and confidence in risk-taking. Internal consistency was evaluated using Cronbach’s alpha to guarantee the engagement scale’s reliability.

Moreover, study’s findings confirm an increasing corpus of research pointing game-based learning not just as a fun addition to education but also a strong pedagogical tool encouraging active learning environments addressing students’ academic and affective needs (Ti, 2025).

Local

The review of related studies in the local contexts gave a clearer direction of the current study. Using the lens of local setting enabled the researcher to see the contextualization of the topic. This contextualized view of the study paved the way to design a more relevant intervention plan that would cater to the needs and present situations of the target respondents.

Effectiveness of game-based learning in the language and literacy of kindergarten pupils. Lojero (2025) study at Balasi, Apayao investigated the effectiveness of game-based learning in enhancing the language and literacy skills of kindergarten pupils. Using a quasi-experimental design, the study involved two groups of learners: one exposed to traditional teaching methods (control group) and another engaged through game-based learning strategies (experimental group). Result of the study revealed a significant improvement in the performance of the pupils in the experimental group compared to those in the control group, suggesting that game-based learning positively impacts early literacy development (Lojero, 2025).

Effectiveness of game-based learning in social studies. In the study of Tolentino, et al. (2024), the perceptions of Grade 9 students at General de Jesus College towards game-based learning in the context of Social Studies Education. Using a quantitative method to gather data, respondents denoted that they learned most effectively when game-based learning activities were utilized by their teachers. Results further showed that the students believed that game-based learning is enjoyable and engaging.

Likewise, it is concluded that “in terms of maintaining their focus, a very positive perception towards game-based learning ‘s ability to catch attention, thus, enhancing the concentration retention. In addition to, findings revealed that respondents feel that game-based learning keeps them motivated to learn and enhance their interest, concentration, and engagement in studying Social Studies” (Tolentino, et al., 2024).

Further, Mascara (2024), proved in his study at Iligan City, Philippines that game -based activities significantly enhanced student engagement by promoting active participation, fostering collaborative learning, and creating an enjoyable and dynamic classroom environment. In the study, seven key themes were being explored in interactive strategies such as: collaboration with peers, role-playing, competitive tasks, simulations, board games, puzzles, and traditional Filipino games. Likewise, in terms of impact of game-based teaching activities, five key themes were explored like improved focus, fostered social interaction, increased enthusiasm for learning, improved retention of knowledge, and improved participation through competition.

On the same vein, study's findings revealed that game-based learning plays a vital role in enhancing collaboration, creativity, and critical thinking in Araling Panlipunan. It is further concluded that game-based learning effectively improves performance of students in Araling Panlipunan (Mascara, 2024).

Effectiveness of game-based learning in science. Lotivio and Bercasio (2022), explored the effectiveness of game-based learning using indigenized instructional materials in science to the grade six students at Legazpi City, Philippines. Data were gathered using parallel pre- test and post-test classroom observation. Mean percentage score, t-test for paired samples, and effect size were the statistical treatments used in the said study. An improvised Portable Science Playhouse (PSP) was made through recyclable materials and indigenized through the use of local materials for the mixtures. The lessons focused on different mixtures and their characteristics using PSP.

Results of the said study revealed that the effectiveness of game-based learning using PSP supports the findings showing that game-based learning improves the learning achievement of elementary pupils, middle school, high school, and even undergraduate students. It is further concluded that “the effective use of simple equipment over the expensive one results in positive learning, while indigenization is an effective teaching -learning strategy” (Lotivio & Bercasio, 2022).

Similarly, Caparoso and Orleans (2024), investigated the efficacy of inquiry-based digital game-based learning in science to junior high school students at Iligan City, Philippines. Design-based research guided the design, development, and implementation, and redesign processes of the prototype pedagogical model. The principles that informed the design of the model were gleaned from empirical data on digital-based game-based learning (DGBL). Study’s result indicated that the tryout results in both the game-based and PhET-based lessons have positive effects on students’ motivation towards learning science. Moreover, results revealed that game -based learning has the ability to improve students’ performance in Science (Caparoso & Orleans, 2024).

Digital game -based learning and mathematics achievement of students.

Yumang (2024), conducted research on digital game-based learning and the mathematics achievement scores in grade seven students at General Santos City. The study was conducted to determine the effects of the new teaching strategy of using digital game-based learning on students’ achievement score, compare results of achievement scores between traditional teaching and digital game-based

learning on students' achievement. Utilizing an experimental research design, study's result showed that digital game-based learning was found to be effective for Mathematics K to 12 students. Using digital game-based learning like puzzle, role playing, and simulation proved that students' scores significantly increased (Yumang, 2024).

Game-based learning affects students' motivation and academic achievement. Tinambunan and Orongan (2023), conducted the influence of game -based learning on students' motivation and academic achievement to the grade nine students at Valencia National High School, Valencia, Bukidnon. Utilizing a quasi-experimental research design involving two groups exposed to non- game-based learning and game-based learning. The instrument used were both academic and non-academic assessment.

Specifically, the findings of the study revealed that "the students' motivation toward science learning for both groups under non- game -based learning and game -based learning is "moderately motivated". In terms of students' academic performance, in non -game-based learning remained "Did Not Meet Expectations [DNME]" while those who belong in game -based learning showed improvement from DNME to "Satisfactory [S]". Additionally, the students' academic achievement was positively affected by the game -based learning (Tinambunan & Orongan, 2023).

Barriers in game-based learning. The study of Sabornido, et al. (2022), synthesized the barriers and challenges of game -based learning in Mandaue, City, Cebu, Philippines. The study has generated a different perspective on gamification

for tertiary education. Results of the study showed that the key challenges and barriers in game -based learning are: not all students are fully -engaged; tasks were not completed; performance was compromised; and problems in attitude arose.

Similarly, Quilab, et al. (2025), confirmed in their study that although game-based learning has positively helped in the teaching-learning process, there are still challenges that hinder its effectiveness like: device lag, which posed a major barrier to effective implementation.

Talandron-Felipe (2026), conformed that despite the positive influence of game -based learning in education, there are barriers that limit its implementation. Several barriers such as the digital divide and teachers' insufficient training on game -based learning, hinder its adoption.

Also, Zaspá (2024), affirmed in her study that utilizing game-based learning to Filipino students in teaching particularly English is challenging due to technical issues, time constraint, lack of available resources, students' lack of vocabulary, teachers' incompetence in game mechanics, and internet connection. Moreover, Joaquin, and Imbat (2024), denoted some challenges in the effective implementation of game-based learning like the well-known dependency on equipment and software that parties encountered. Other reports showed that teachers' unpreparedness and lack of pedagogical strategies often hindered the effective implementation of game-based learning (Joaquin & Imbat, 2024).

Lastly, according to the study of Labana, et al. (2020), game-based learning is not just challenging to implement but has also negative effect on the students. It

is concluded in the said study that “due to its competitive tasks, depression is a serious threat that needs to be addressed” (Labana, et al., 2020). Thus, lack of sufficient mental health interventions in the Philippines is the number one reason that hinders the full implementation of game-based learning in the classroom.

Synthesis

This portion presents the combined ideas of the reviewed studies from foreign and local sources about game-based learning and performance of grade 6 learners in mathematics. It highlighted similarities and differences and trends across literatures all over the world.

Encapsulating all the reviewed related studies from both foreign and local sources, it affirmed the effectiveness of game-based learning in the teaching - learning process. Numerous authors consistently validated the efficacy of game - based learning strategy and activities highlighting its positive impact on students' motivation, interest, and academic achievement. It is further proven in several studies all over the world, including the Philippines, that game-based learning significantly affected the academic achievement of the learners like in Chemistry, Language and Literacy, Social Studies, Araling Panlipunan, and Mathematics.

However, despite its claims that game-based learning has positively influence the academic achievement of the learners, a number of studies conformed that barriers like technical issues, teachers' incompetence on game mechanics, lack of available resources, and time constraint impede its full implementation.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presented the research methodology being employed, the sampled target respondent-individuals, the environment, the statistical treatment utilized, and the gathering procedures did in order to generate the needed data that were analyzed and interpreted and served as basis in coming up with inferences and recommendations. It also showed the scoring procedure of the numerical data that provided the figures used for analyses and interpretations, paving the way to inferences, conclusion, and recommendations.

METHOD

This section presented and discussed the method that was utilized in this study. It described the details and importance of selecting the most appropriate method that was used in the research.

This study utilized the descriptive method of research. The descriptive method is the most popular approach since it enumerates the traits of a person, a group, or an environment. This type of research methodology was used by the researcher to get first-hand information from the outcomes of the respondents' evaluations, which help to generate logical and sound findings and suggestions for the study. This method described the profile of the teachers in terms of their highest educational attainment, number of years in teaching and number of relevant trainings attended.

The descriptive method focused on collecting and organizing numerical data across groups. It allowed the researcher to assess the extent of efficacy of game-based learning as perceived by the learners as to: self-management skills, openness to learning opportunities, and initiative and independent learning. Likewise, the descriptive method also helped the researcher in determining the performance of the grade six learners in Mathematics in relation to Rapid Mathematics Assessment [RMA] BOSY and EOSY results using the adapted tool. Hence, this enabled the researcher to generate knowledge and create a better perspective of the challenges met by the teachers in utilizing game-based learning. Hence, the results of the study were used as bases in designing an intervention plan that would highlight the advantages of using game-based learning as a tool to improve performance of the learners in Mathematics.

FLOW OF THE STUDY

This portion showed the schematic representation of the flow of the research study. It started from the left going to the right. The uppermost box revealed the inputs, the middle box displayed the process, and the lowermost box exhibited the output of the study.

Input.

This phase of the study related to four variables where the first input showed the profile of the teachers in terms of highest educational attainment, number of years in teaching, and number of relevant trainings attended. The

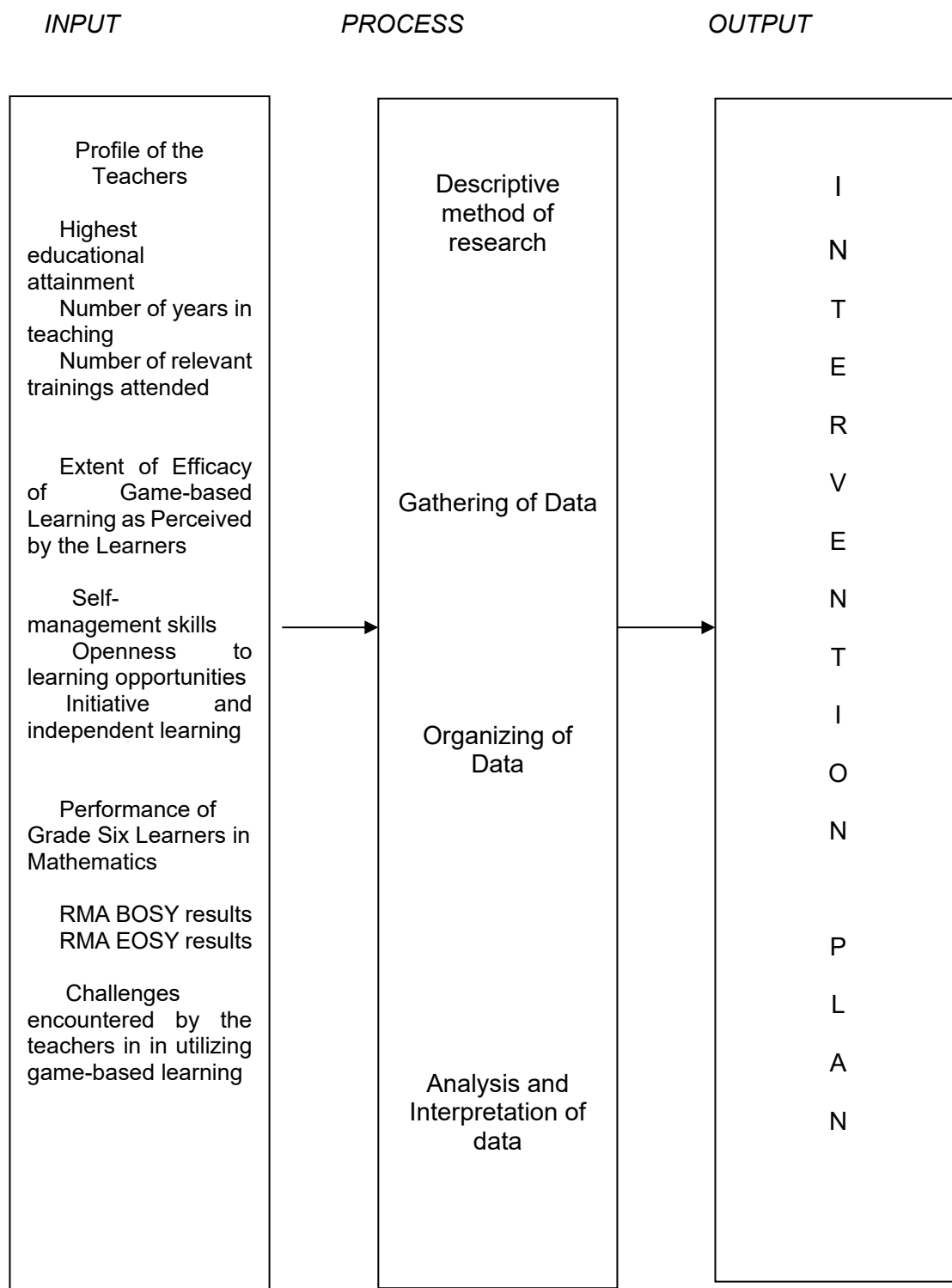


Figure 2. *Schematic Diagram of the Flow of the study*

second input referred to the extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities, and initiative and independent learning. The third input referred to the performance of the grade six learners in terms of RMA BOSY and EOSY results. The last input referred to the challenges encountered by the teachers in utilizing game-based learning. These variables were necessary data that served as guide in crafting an intervention plan to address the gap in utilizing the game-based learning to improve the performance of the learners in mathematics.

Process.

The process phase started after all the necessary communications were approved. This phase included administration of questionnaires to the respondent groups. Research questionnaires intended for the learners, the parents, and teachers were personally distributed, administered, and retrieved by the researcher. After gathering all relevant data, results from retrieve questionnaires were tallied, tabulated, statistically treated, analyzed, and interpreted, and ended with the conclusions and recommendations.

Output.

The third phase depicted the outcome from the interpreted result of the study. A plan such as action plan, intervention plan and other aspects of study were made into consideration. Hence, the output this study was an intervention

plan in utilizing the game-based learning to improve the performance of the learners in mathematics that were based on the findings of the study.

ENVIRONMENT

The study was conducted in Gun-ob Elementary School among the grade one learners. This school was in Gun-ob, Lapu-Lapu City. It belonged to District 6, Division of Lapu-lapu City. Gun-ob Elementary School (GES), the lone public elementary school in Gun-ob, Lapu-Lapu City, was established in January 1964. It was located 1.8 kilometers away from the Lapu-Lapu City Division office and situated just at the side of the Lapu-Lapu City District Hospital and a few steps from Gun-ob Barangay Hall. It has a total land area of approximately nine thousand, two hundred thirty-seven square meters (9, 237 m²) acquired through donations.

The K to 12 Curriculum was used from Kindergarten to Grade Six in the delivery of instruction using the different strategies and methodologies which were developmentally appropriate for the learners.

It has 56 nationally funded teaching personnel. Among the 56 teachers, five (5) were Master Teacher I, twenty-eight (28) Teacher III and twenty-three (23) Teacher I. It has 17 buildings with 36 classrooms utilized by 54 classes. There were 26 classrooms with comfort rooms. The Grades One, two and three classes were observing shifting classes due to the shortage of classrooms. It has a computer room with 14 units of computers. The Home Economics building served as a multifunctional area school clinic and canteen, feeding area. It has 1

MAP OF LAPU-LAPU CITY

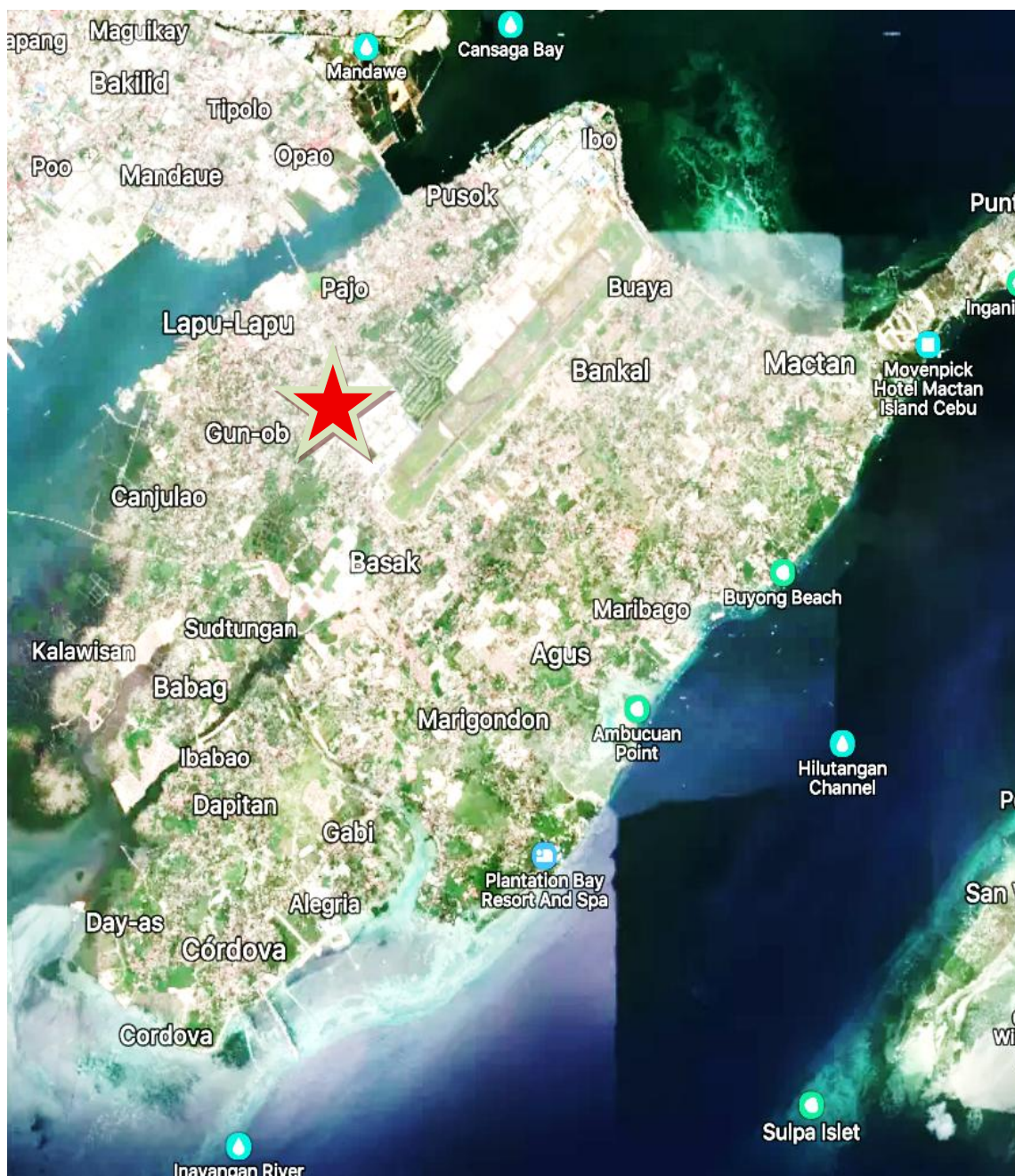


Figure 3: *Map of the Research Environment*

security guard and 2 utility workers funded by school MOOE and PTA voluntary donations. The school has a covered court and a stage that was partially damaged by Typhoon Odette, which needs to be repaired.

RESPONDENTS

This section discussed the sample frame and the target population. This described the sampling technique in obtaining the sample data in the research investigation. The researcher employed the population of the 114 grade six learners, and six teachers-respondents of Gun-ob Elementary School, Division of Lapu-Lapu City in the school year 2025-2026. The number of respondents per group category were reflected in the Table 1.

Table 1

Distribution Profile of the Respondents (n= 120)

<i>Sector</i>	<i>Frequency (f)</i>	<i>Percent (%)</i>
Learners	114	95.00
Teachers	6	5.00
Total	120	100.00

Table 1 showed the distribution profile of the respondents. As reflected, there were 114 or 95.00 percent of grade six learners, and 6 or 5.00 percent of

teachers as the target respondents of this study. It had a total 120 or 100.00 percent respondents.

INSTRUMENT

This section detailed the formulation of the tool and the scoring procedure based on the tool used. It described the sequence of the tool used and the scoring procedure based on the problem sequence.

There were four sources of data to be studied. The first source was generated using a self-formulated tool. The second source of data was generated using the adopted tool from Velasques, et al., (2024) for the extent of efficacy of game-based learning. The third source was generated using the adopted tool from (*RMA Toolkit, DO 18, 2025*), for the performance of the grade six learners. The fourth source of data was generated using the adopted tool from Yaman, et. al. (2024) for the challenges encountered by the teachers in game-based learning and performance of the learners in mathematics.

Formulation

This section presented the procedures in designing the research instruments. These included the instruments on the profile of the teachers, extent of efficacy of gamed-based learning, performance of the grade six learners, and the challenges encountered by the teachers in utilizing game-based learning and performance of the learners in mathematics.

Part I had utilized a self-formulated tool to gather data for profile of the teachers in terms of highest educational attainment, number of years in teaching, and number of relevant trainings attended.

Part II on gathering the data for the extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities, and initiative and independent learning, an adopted tool from Velasques, et al. (2024) was used.

Part III for the performance of the grade six learners in terms of RMA BOSY and EOSY results, an adapted tool from *RMA Toolkit, (DO 18, 2025)*, was utilized.

Part IV on gathering the data for the challenges encountered by the teachers in utilizing game-based learning to improve the performance of grade six learners in mathematics, an adapted tool from Yaman, et. al. (2024), was employed.

Scoring

To identify the figures used for analyses and interpretation, the following scoring procedures were used. This guided the researcher on how to come up with a set of numbers that served as basis in making inferences.

Part 1 on the profile of the parents, the researcher had utilized the frequency counts and simple percentage.

Part 2 on the extent of efficacy of game-based learning as perceived by the learners, the researcher utilized the adopted tool from Velasques, et al. (2024). The scoring guide was presented herein, weight, range, category and verbal interpretation.

Weight	Range	Category	Verbal interpretation
4	3.25 – 4.00	Very High Extent (VHE)	The indicator greatly affected the performance of the learners
3	2.50 – 3.24	High Extent (HE)	The indicator moderately affected the performance of the learners
2	1.75 – 2.49	Low Extent (LE)	The indicator slightly affected the performance of the learners
1	1.00 – 1.74	Very Low Extent (VLE)	The indicator has not affected the performance of the learners

Part 3 on the performance of the grade six learners, an adopted tool, RMA Toolkit, (DO 18, 2025), was used. The RMA standard scoring guide was presented as range, category and verbal description.

Range	Category	Verbal interpretation
85 - 100	Highly Proficient (HP)	The learners' performed 85% to 100% of the tasks correctly
75 - 84	Proficient (P)	The learners' performed 75% to 84% of the tasks correctly
50 - 74	Nearly Proficient (NP)	The learners' performed 50 % to 74 % of the tasks correctly
25 - 49	Low Proficient (LP)	The learners' performed 25% to 49 % of the tasks correctly
1 - 24	Not Proficient	The learners' performed 1 % to 24 % of the tasks correctly

Part 4 on the challenges encountered by the teachers in utilizing game-based learning to improve the performance of grade six learners in mathematics,

an adapted tool from Yaman et. al. (2024), will be used. The scoring guide was presented as weight, range, category and verbal description.

Weight	Range	Category	Verbal description
4	3.25- 4.00	Highly Challenging (HC)	The challenges are always experienced by the teachers.
3	2.50- 3.34	Moderately Challenging (MC)	The challenges are frequently experienced by the teachers.
2	1.75- 2.49	Slightly Challenging (SC)	The challenges are sometimes experienced by the teachers.
1	1.00- 1.74	Not Challenging at All (NCA)	The challenges are not experienced by the teachers.

PROCEDURE

This section presented the ways and means in gathering the data needed for this scholarly work. Likewise, it detailed the different statistical instruments used for analyses and interpretation of data that would affirm the validity of this study.

Data Gathering

Prior to the administration of the research instrument, the researcher had asked an approval from the head of office where the research was conducted. The transmittal letter was presented to the school principals by the researcher seeking permission for the conduct of the research activity by distributing

questionnaires to the respondents and to use the needed data that were stored in the office of the school guidance designate.

The researcher personally gathered the secondary data from the school offices of the guidance office designate and administered the survey questionnaire to the respondent groups, and retrieved these questionnaires after the allotted time of the respondents' school. The responses that were elicited from the questionnaires were tabulated, analyzed, and interpreted

Statistical Treatment

In order to interpret quantitatively the results of the study, the following statistical treatments were utilized, such as: frequency counts and simple percentage, weighted mean, t-test, and chi square. The results of these statistical treatments were basis in making interpretations, drawing inferences, conclusion, and recommendations.

Frequency counts and simple percentage. The statistical treatment was used to determine the number of responses by the parents with regard to the for profile of the teachers in terms of highest educational attainment, number of years in teaching, and number of relevant trainings attended.

Weighted mean. The statistical treatment was utilized to determine the extent of efficacy of game-based learning as perceived by the learners, and the challenges encountered by the teachers.

T-test Paired Sample. The statistical treatment was used to determine the significant mean difference between the RMA BOSY and EOSY results.

Chi square. The statistical treatment was used to determine the significant relationship between the extent of efficacy of game-based learning and the performance of the grade six learners in mathematics.

ETHICAL CONSIDERATIONS

Many ethical factors were considered when conducting the study. Respect for the research participants was the most important ethical principle that the study adhered to. The study's participants then established a basis for various ethical precepts. Voluntary participation, informed consent, anonymity, confidentiality, risk of harm, and results communication devoid of errors and plagiarism are among these principles.

Voluntary Participation

Participation in this project is entirely optional. Over the course of this study, participants may choose to discontinue participation at any time without feeling required or pressured to give a reason. The target participants were also informed that declining to participate would not have any negative consequences.

Informed Consent

The target participants signed an informed consent form before the study was conducted. They were oriented about the study's exclusive use for academic purposes as well as its advantages, potential risks, and the kind of data that would be collected.

Anonymity

The participant's information would remain anonymous to the researcher. Participant data should not be collected for a study unless it is crucial to the protocol of the study.

Confidentiality

The researcher ensured the confidentiality of the gathered data relative to the personal information of the respondents of this study and did not disclose to the public at any cause.

Potential to Harm

Accordingly, any relevant data or information of the respondents of this study should not be accessed, moved, or copied without the researcher's permission and the respondents' consent, since the Data Privacy Act (RA 10173, 2012) safeguarded the interests of the respondents or participants.

Results Communication is Free of Plagiarism and Inaccuracies

The researcher made certain that the manuscript contained no instances of plagiarism or research misconduct and accurately described the findings.

CHAPTER 4

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presented the data collected based on the variables of the study. It included the presentation, analysis, interpretation and connected readings. Data included the profile of the teachers, the extent of efficacy of game-based learning as perceived by the learners, the performance of the grade 6 learners in mathematics in relation to Rapid Mathematics Assessment (RMA), the significant mean difference between the RMA BOSY and EOSY results, significant relationship between the extent of efficacy of game-based learning and the performance of the grade 6 learners in mathematics, and the challenges encountered by the teachers in utilizing game-based learning.

PROFILE OF THE TEACHERS

This section presented of profile of the teachers in terms of their highest educational attainment, number of years in teaching and number of relevant trainings attended. It provided a detailed overview of the individual involved in this study.

The profile of the teachers was presented using the frequency count which was expressed in percent. This data was presented in the Table 2.

Highest Educational Attainment

This section presented the profile of the teachers in term of their highest educational attainment. The data highlighted that there were four or 66.67 percent

Table 2*Profile of the Teachers (n = 6)*

	Frequency (f)	Percent (%)
<i>Highest Educational Attainment</i>		
Masters' units	4	66.67
Bachelor's degree	2	33.33
Total	6	100.00
<i>Number of Years in Teaching</i>		
More than 10 years	4	66.67
Seven to 10 years	2	33.33
Total	6	100.00
<i>Number of Relevant Training Attended</i>		
10 and above	4	66.67
Seven to nine trainings	2	33.33
Total	6	100.00

of the teachers who have earned units in masteral degree, two or 33.33 percent of the teacher who had a bachelor's degree only.

This finding implies that majority of the teachers in the school has units in masteral degree which will significantly impact to the performance of the learners. The higher educational background of teachers will also increase the knowledge, strategies, skills of the teachers in teaching their field of specialization, and

techniques in the integration of lesson by using technology. Moreover, teachers with advanced educational background will equip their knowledge and skills, and they become more effective in the delivery of the lessons that is more motivating and engaging to the learners which will encourage the learners to study hard and always ready to their daily lessons, leading to better learner outcomes.

Bulilan (2022), concluded in his findings that the majority of the teachers met the minimum educational requirement for faculty positions in higher education institutions set by CHED, they are qualified to teach in college. Their rate of very satisfactory made them competent. Moreover, “findings revealed that there is significant correlation between teaching competencies and educational attainment. This means that the higher the educational attainment of the teachers, the more competent the teachers become”, (Bulilan, 2022).

Number of Years in Teaching

This portion provided the profile of the teachers in terms of their number of years in teaching experience. The data showed that there were four or 66.67 percent of the teachers had their length of teaching experience ranging more than 10 years, two or 33.33 percent of the teachers had their length of teaching experience ranging seven to ten years.

The finding implies that the teachers assigned in the grade level varied in the number of years in teaching. The number of years in teaching is definitely not the basis for the assignment of teachers in the grade level. The assignment of teachers in the secondary level is based on its educational qualification and its major field of specialization. Further, it implies that teaching experience will make

you a better teacher, and can help increase learners' performance and attendance, and helps become an effective teacher as well. Thus, teachers play a vital role in shaping the lives of the learners, influencing not only their performance but also their personal growth and character development.

As affirmed by Masongsong, et. al. (2023), teachers level of training was relatively low. In addition, it was crucial to remember that the study did not discover any appreciable variations in the level of trainings based on different profile variables like age, gender, educational attainment, number of years of teaching experience, and special education training. It was also found that there is a significant difference in the respondents' perceptions of the efficacy of instructional strategies according to age and years of teaching experience.

Further, it revealed that a strong link between teachers' perceptions of their effectiveness in fostering student engagement and their preparation for inclusive educational initiatives. It was also emphasized that the effectiveness of instructional strategies, classroom management, and training in inclusive education program, however, were not found to be significantly related. (Masongsong, et. al. (2023).

Number of Relevant Trainings Attended

This part provided the profile of the teachers in term of the number of relevant trainings attended. The data highlighted that majority of the teachers were four or 66.67 percent who had attended 10 and above relevant trainings, two teachers or 33.33 percent of the teachers who had attended seven to nine relevant trainings.

The finding implies that the teachers need to attend training related to enhancing the capacity of teachers in teaching strategies on the improvement of teacher' efficacy, skills in the integration of technology in teaching and enhancing the performance of the learners. Thus, strategies and techniques in teaching and the mastery of the lessons can be acquired during training, seminar, and professional development of the teachers. Likewise, equip teachers' teaching skills and strategies, deeper learning and stimulating classroom environment that will also contribute to the improvement of the learners' performance.

According to Schwartz (2023), professional development is a part of every teacher's career. Thus, if it is attended to and done well, it provides teachers adequate knowledge and sharpen their abilities in teaching. Likewise, Sancar & Deryakulu (2021), maintained that teachers' professional development is important to improving learners' performance, since through this, teachers' professional life will be upgraded.

EXTENT OF EFFICACY OF GAME-BASED LEARNING AS PERCEIVED BY THE LEARNERS

This section presented the extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities, and initiative and independent learning,

The extent of game-based learning of the respondents' learners were presented using the four-Likert scale and expressed in a weighted mean. The data was detailed in the Table 3.

Table 3

Extent of Efficacy of Game-Based Learning as Perceived by the Learners; (n= 114)

Indicators	Weighted Mean	Interpretation
<i>Self-management Skills</i>		
I am organized while doing game-based activities.	3.23	HE
I finish the tasks on time.	3.40	HE
I need minimal help in solving some problems .	3.28	HE
I can manage myself well during collaborative activities.	3.09	HE
I respect my classmates' ideas.	3.78	VHE
General weighted mean	3.36	VHE
<i>Openness to Learning Opportunities</i>		
I learn from my mistakes and accepts advice from my groupmates.	3.15	HE
I want to learn new information.	3.25	VHE
I can work with peers collaboratively without pressure.	3.61	VHE
Game -based learning develops my critical thinking skills.	3.63	VHE
I become more technologically literate because of interactive games during class.	3.16	HE
General weighted mean	3.36	VHE
<i>Initiative and Independent Learning</i>		

Table 3, continued...

I evaluate my own performance.	3.79	VHE
I am aware of my limitations.	3.03	HE
I like to solve mathematical problems and puzzles..	3.22	HE
I enjoy and have positive attitude towards learning activities.	3.29	VHE
I can find out information myself.	3.41	VHE
General weighted mean	3.35	VHE
Overall weighted mean	3.36	VHE

Legend		
Weight	Range	Category
4	3.25 - 4.00	Very Highly Extent (VHE)
3	2.50 - 3.24	High Extent (HE)
2	1.75 - 2.49	Low Extent (LE)
1	1.00 - 1.74	Very Low Extent (VLE)

Self-management Skills

This section presented the overall weighted mean on the extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities and initiative and independent learning was rated 3.36 classified as very high extent.

The data revealed that the general weighted mean of self-management skills was rated 3.36 categorized as very high extent. The highest rating among the indicator statement was “I respect my classmates’ ideas” had rated 3.78 categorized as very high extent. The second in rank among indicator was “I finish the tasks on time” had rated 3.40 categorized as very high extent, and the lowest

among the indicator statement was “I can manage myself well during collaborative activities” had rated 3.09 categorized as high extent.

The findings imply that game-based learning is perceived by the learners to have a very high extent efficacy in developing their self-management skills. The result suggests that game-based learning provides opportunities for the learners’ to interact, collaborate, listen to different perspectives, and practice respect for the opinions of others. Further, indicates that game-based learning may encourage learners to develop responsibility, task-completion, time management and self-discipline. Thus, game-based learning may be considered not only strategy for enhancing academic engagement but also a means of developing important and interpersonal skills among learners.

As affirmed by Yumang (2024), stated that play is a very common, fun and complicated experience to human beings, in both young and adults. Game-based learning is defined as any activities that have a game at their core, either as the main activity or as a stimulus for other related activities, and provide learning as a desired or incidental outcome. The use of digital games has positively impacted the mathematics achievement of learners in terms of problem-solving involving conversion units of measurement, patterns and algebra, and addition and subtraction of polynomials, and other competencies in Mathematics. Through integrating digital-games, students feel motivated and engaged.

Openness to Learning Opportunities

The portion highlighted the extent of efficacy of game-based learning as perceived by the learners as to openness to learning opportunities. The data

revealed that the general weighted mean of all indicators on the openness to learning opportunities was rated 3.36 categorized as very high extent. The highest rating among the indicator statement was “Game -based learning develops my critical thinking skills” had rated 3.63 categorized as very high extent. The second in rank among indicator was “I can work with peers collaboratively without pressure” had rated 3.61 categorized as very high extent, and the lowest among the indicator statement was “I learn from my mistakes and accepts advice from my groupmates” had rated 3.09 categorized as high extent.

The findings imply that game-based learning has a very high extent in developing learners’ openness to learning opportunities. This result suggests that game-based learning can create an engaging and supportive learning environment that encourages learners to think critically, collaborate confidently and remain receptive to a new learning experience. Thus, game-based learning may be utilized as supplementary instructional approach to promote not only academic learning but also learners’ active participation and continuous desire to learn.

As supported by Mascara (2024), game -based activities significantly enhanced student engagement by promoting active participation, fostering collaborative learning, and creating an enjoyable and dynamic classroom environment. In the study, seven key themes were being explored in interactive strategies such as: collaboration with peers, role-playing, competitive tasks, simulations, board games, puzzles, and traditional Filipino games. Likewise, in terms of impact of game-based teaching activities, five key themes were explored

like improved focus, fostered social interaction, increased enthusiasm for learning, improved retention of knowledge, and improved participation through competition.

Initiative and Independent Learning

The part provided the extent of efficacy of game-based learning as perceived by the learners as to initiative and independent learning. The data highlighted that the general weighted mean of all indicators on the initiative and independent learning was rated 3.35 categorized as very high extent. The highest rating among the indicator statement was “I evaluate my own performance” had rated 3.79 categorized as very high extent. The second in rank among indicator was “I can find out information myself” had rated 3.41 categorized as very high extent, and the lowest among the indicator statement was “I am aware of my limitations” had rated 3.03 categorized as high extent.

The findings imply that game-based learning has a very high extent in developing learners’ initiative and independent learning. The result suggests that the game-based learning can strengthen learners’ sense of responsibility, self-directedness, motivation, and confidence in managing their own learning. Thus, teachers may continue to integrate appropriately designed game-based activities to provide learners with opportunities to take initiative, reflect their own performance, and become more independent and active participants in the learning process.

As supported by Al-Khayat, et al. (2023), found that game-based learning leads to increased motivation, engagement, and cognitive skill development in students. Through the creation of an immersive and interactive learning

environment, games foster problem-solving, critical thinking, and collaboration skills. Further, it is concluded that game-based learning has greatly impacted in enhancing students' motivation and cognitive skills

*PERFORMANCE OF THE GRADE 6 LEARNERS IN MATHEMATICS IN
RELATION TO RAPID MATHEMATICS ASSESSMENT (RMA)*

This section presented the data on the performance of the grade 6 learners in mathematics in relation to Rapid Mathematics Assessment (RMA) BOSY and EOSY results. The level of learners' performance in mathematics in Rapid Mathematics Assessment (RMA) in terms of BOSY and EOSY results was presented in a simple frequency distribution and expressed in percent. This data was presented in the Table 4.

Table 4

Performance of the Grade 6 Learners in Mathematics in Relation to Rapid Mathematics Assessment (RMA), (n=114)

Category	RMA BOSY results		RMA EOSY results	
	(f)	(%)	(f)	(%)
Highly Proficient (HP)	1	0.88	15	13.16
Proficient (P)	5	4.39	22	19.30
Nearly Proficient (NP)	23	20.18	50	43.86
Low Proficient (LP)	64	56.14	21	18.42
Not Proficient (NP)	21	18.42	6	5.26
Total	114	100.00	114	100.00

BOSY Results

This section highlighted the level of learners' performance in mathematics based on rapid mathematics assessment in term of BOSY results. The data revealed that the highest number of learners obtained the performance in mathematics were 64 (56.14) percent categorized as low proficient; the second highest number learners were 23 (20.18) percent which was categorized as nearly proficient, and the least number of learners was one (0.88) percent which was categorized as highly proficient.

The finding implies that a greater number of the learners belong to the nearly proficient, and the rest belongs to low proficient, and not proficient. This denotes further that learners need intervention programs in numeracy. Then, the integration of game-based learning will enhance learners' interest, motivation, and collaboration. Thus, more strategic interventions are needed to cater the diverse learners and need to address challenges for the development of mathematics skills and increases learners' performance in mathematics.

As supported by Dela Peña and Doronio (2025), showed in the results of the pre-test that they were not very good performance in mathematics. This indicates that the learners had a problem in understanding important ideas or terms with just standard teaching method, showing that there is a clear need for better and interesting ways to teach arithmetic to enhance learner outcomes. Further, indicated that there is a need to improve the teaching strategies by

introducing different activities that will making teaching enjoyable and motivate learners to study more for the future preparation in life.

EOSY Results

This section denoted the level of learners' performance in mathematics based on rapid mathematics assessment in term of EOSY results. The data indicated that the greatest number of learners obtained the performance in mathematics were 50 (43.86) percent which was categorized as nearly proficient, the second highest number learners were 22 (19.30) percent which was categorized as proficient, and the least number of learners were six (5.26) percent which was categorized as not proficient.

This finding implies that the learners have improved in their performance in mathematics as evident in their assessment results. This finding implies further that the teachers and the parents have collaboratively exerted efforts and time to develop the learners' performance in mathematics. The teaching methods, curriculum, interventions and the integration of the game-based learning implemented successfully helped learners develop their numeracy skills. It is also evident that the intervention, remedial program and integration of game-based learning were put in place to address numeracy, their success is evident in improved post-test results. Moreover, indicates that when teachers exerted more effort, improving strategies and techniques, enhance mastery of the basic mathematical skills, application of solving mathematic problem to the real-life situations, collaborate with the other teachers by sharing best practice in teaching

mathematics, and stakeholders for better learning outcome is not impossible to attain.

As confirmed by Elopre and Baggay (2022), concluded in their research study on numeracy through literacy revealed that there was a significant increase in the level of performance of the students during the post test conducted after the intervention period. The overall result of the intervention provided was an increase in student understanding and show evidence for the efficacy of intervention program in improving children's achievement in mathematics. Hence, it was concluded in their study that providing an intervention program was effective in improving both literacy and numeracy skills of the learners.

*SIGNIFICANT MEAN DIFFERENCE BETWEEN RMA BOSY AND EOSY
RESULTS IN THE PERFORMANCE OF GRADE 6 LEARNERS IN
MATHEMATICS*

This section presented the significant differences in the learners' performance in mathematics between the RMA BOSY and EOSY results. The data provided using the T-test statistical treatment for paired variables at 0.05 level of significance. The data reflected herein such as the scores of dependent samples, degree freedom (df) the T-value, critical value, the decision and its interpretation. The data were presented in the Table 5.

Table 5 showed the the significant mean difference in the learners' performance in mathematics between the RMA BOSY and EOSY results. The data revealed that the computed t-value was 9.977 and the critical value obtained from

the table with degree of freedom of 113 at 0.05 degree of significance was 1.986. Since, the computed t-value was greater than the critical value. Thus, the null hypothesis was rejected. Therefore., the interpretation was significant.

Table 5

Significant Mean Difference Between the RMA BOSY and EOSY Results in the Performance of Grade 6 Learners in Mathematics (n= 114)

Paired Variables	Means	Diff	df	Computed t-value	Critical t-value	Decision	Interpretation
BOSY	24.68						
and EOSY Results	31.09	6.41	113	9.977	1.986	Reject Ho	Significant

This finding implies that there is a significant mean difference in the learners' performance in mathematics between the RMA BOSY and EOSY results. The significant increase of learners' performance in mathematics suggests that the integration of the game-based learning and interventions implemented have been effective in enhancing learners' performance in mathematics based in RMA test results. This indicates that the curriculum, teaching methods, resources and integration of the game-based learning are successfully addressing learners' learning needs of improving the performance in mathematics.

As supported by Tinambunan and Orongan (2023), revealed that "the students' motivation toward science learning for both groups under non- game - based learning and game -based learning is "moderately motivated". In terms of

students' academic performance, in non -game-based learning remained "Did Not Meet Expectations [DNME]" while those who belong in game -based learning showed improvement from DNME to "Satisfactory [S]". Additionally, the students' academic achievement was positively affected by the game -based learning.

***SIGNIFICANT RELATIONSHIP BETWEEN THE EXTENT OF EFFICACY OF
GAME-BASED LEARNING AND THE PERFORMANCE OF THE
GRADE 6 LEARNERS IN MATHEMATICS***

This section highlighted the significant relationship between the extent of efficacy of game-based learning and the performance of the grade 6 learners in mathematics. The data provided using the Chi square test for paired variables at 0.05 level of significance. The data reflected herein such as the paired variables, degree freedom (df), the t-value, critical value, the decision and its interpretation. The data was presented in the Table 6.

Table 6

Significant Relationship Between the Extent of Efficacy of Game-Based Learning and Performance of Grade 6 Learners in Mathematics; (n=114)

Paired Variables	df	Computed value	Critical value	Decision	Interpretation
Game-based learning and Performance of the learners' in mathematics	12	6.076	21.026	Accept Ho	Not significant

Table 6 showed the the significant in the learners' performance in mathematics between the RMA BOSY and EOSY results. The data revealed that the computed t-value was 9.977 and the critical value obtained from the table with degree of freedom of 113 at 0.05 degree of significance was 1.986. Since, the computed t-value was greater than the critical value, Thus, the null hypothesis was rejected.

The finding implies that there is no significant relationship between the extent of efficacy of game-based learning and the performance of grade 6 learners in mathematics. This means that game-based learning may be perceived as effective or may contribute positively to learners' engagement, motivation, and learning experience, but not considered as determining factor of their measure on mathematics performance. Additionally, learners' performance may be influenced by other factors such as prior knowledge, study habits, teaching strategies, attendance, learning environment, parental support, learner motivation, and individual desires. Thus, game-based learning may still be used as supplemental instructional strategy , but its effectiveness should not be evaluated solely on basis on learners' RMA EOSY performance.

Hui and Madmud (2023) found out that the effectiveness of learning mathematics differs depending on the learning environment. As such, the use of game-based learning which promotes and environment that combines game content with knowledge, will enhance the learners' learning progress. The integration of learners' cognitive affective domains with game-based learning, can support the learning process which create an easier yet powerful enough

environment for the learner to study in. However, the teachers faced difficulties when it came to inventing personal gamification tools based on the learner's different mathematical knowledge in order to cater to their needs.

CHALLENGES MET BY THE TEACHERS IN UTILIZING GAME-BASED LEARNING

This section highlighted the challenges encountered by the teachers in improving behavioral practices of the learners. The data reflected using the four Likert scale; the weighted mean, and its interpretation was categorized by the degree of challenged encountered by the teachers such as highly challenging, moderately challenging, slightly challenging and not challenging. The data was presented in Table 7

Table 7

*Challenges Encountered by the Teachers in Utilizing Game-Based Learning
(n=6)*

Indicators	Weighted Mean	Interpretation
Behavioral and attitudinal barriers	3.83	HC
Slow internet connection	3.75	HC
Games literacy	3.65	HC
Insufficient time	3.15	MC
Teachers' incognizance of the game-based learning activities and games literacy	3.05	MC
Lack of digital tools	3.1	MC

General weighted mean		3.42	HC
<hr/>			
Legend			
Weight	Range	Category	
4	3.25 - 4.00	Highly Challenging (HC)	
3	2.50 - 3.24	Moderately Challenging (MC)	
2	1.75 - 2.49	Slightly Challenging (SC)	
1	1.00 - 1.74	Not Challenging at All (NCA)	

Table 7 showed the challenges met by the teachers in utilizing game-based learning in mathematics. The data revealed that three of the challenges indicators were rated as highly challenging and three of the indicators were rated as moderately challenging with the general weighted mean was 3.42 rated as highly challenging. The highest among the challenges indicator statement as stated “Behavioral and attitudinal barrier” had rated as highly challenging with the weighted mean of 3.83, the second highest of the indicator statement as stated “Slow internet connection’ has rated as highly challenging with the weighted mean of 3.75, the third highest of the indicator statement as stated “Games literacy” had rated as highly challenging with the weighted mean of 3.65, and the least challenged among the indicator statement as stated “Teachers’ incognizance of the game-based learning activities and games literacy” had rated as moderately challenging with the weighted mean of 3.05.

The finding implies that are not totally improved when they were in the beginning of the school year where they started to introduce the intervention plan or integration of game-based learning in mathematics. This finding further suggests that teachers have exert more efforts and strengthen the mastery of the basic operations, motivate the learners to have fun in mathematics practices, and

inculcate in the minds of the learners that mathematics is significant in our daily life situations.

As supported by Yaman, et al. (2024), stated that games are vital for social interaction, personal growth and development. However, even though games have many potential benefits, there are also some challenges that need to be taken into account. These barriers include behavioral and attitudinal barriers; school policy barriers; material and technology barriers; and barriers related to game literacy.

Also, Jääska and Aaltonen (2022), cited that the perceived challenges of game-based learning for students manifest as increased cognitive load and stress. Challenges for teachers usually cause negative consequences for students. For students, game-based learning may be time-consuming, and game session durations can be difficult to predict.

Likewise, Jumawid (2024), concluded that the learners need to be constantly motivated, receive instant feedback from the teachers, the learning environment must always be welcoming and friendly. In addition, challenges met by the teachers are time pressure due to overlapping demands, social interactions and lack of autonomy.

OUTPUT

AN INTERVENTION PLAN

Rationale

As emphasized by the Department of Education (DepEd), the development of numeracy and mathematical skills should be given focus. Several investigations revealed that most learners found Mathematics as a boring subject and a difficult one causing other learners to have fear and anxiety towards the subject. Thus, educators around the globe continually proposed innovations in teaching mathematics that tend to increase learners' engagement. One of these innovations, is the utilization of game-based learning as an approach or strategy in teaching math concepts.

In this investigation, game-based learning significantly contributes to the mathematics performance of grade six learners in Gun-ob Elementary School. Nonetheless, whether game-based learning contributes to an improved mathematics' performance of learners, there are still hindrances that resulted from this investigation, thus, this intervention plan is humbly made.

Objectives:

This intervention plan would be of great help in sustaining the implementation of game-based learning to improve the mathematics performance of the learners. Thus, the objectives of this intervention plan are further specified:

- 1.To introduce innovative strategies and techniques that will heighten the implementation the learners' performance in numeracy and in mathematics;
- 2.To allocate extra time for the learners to enhance their skills in mathematics;

3.To reinforce activities that will sustain the intervention programs that have been found to be effective in increasing the mathematics performance of the learners.

Scheme of Implementation

The implementation will be divided into three phases which include the pre-implementation phase, proper implementation phase, and post-implementation phase. This is therefore the scheme of implementations of the proposed intervention plan .

The implementation of intervention plan consists of the following parts:

Pre-implementation Phase. During this stage, the teachers together with the school head will identify the issues and problems related to the utilization of game-based learning in mathematics. Likewise, in this stage , least learned competencies/ tasks in mathematics will also be identified. Moreover, strategies that are proven effective must also be identified.

The following strategies are to be undertaken in preparation of the proper implementations of the proposed interventions:

- a. Presentation of the proposed intervention plan to the school and district level for review and possible alignment and approval;
- b. Discuss the different strategies in the plan;
- c. Discussion of the financial requirements of the plan to ensure smooth implementation of the program;
- d. Conduct consultations with the school head and other DepEd officials to ensure the support and collaboration in the realization of the plans;
- e. Conduct proper channeling and coordination to ensure mobilization and leveling off of the deliverables and expectation among the teachers and other stakeholders of the school;

- f. Make sure that the plan has been approved by the proper authorities to ensure continuity of the implementation of the activities and strategies;

Proper Implementation Phase. This is the second phase of the implementation. During this stage constant monitoring about the activities undertaken will be done. Records must be intact and updated with regard to the activities being done. Concerns, Issues , Gaps, and Problems (CIGPs) encountered during this stage must also be noted The following activities are suggested to carry out during the implementation phase.

- a. Ensure that every detail of the proposed intervention plan is promptly implemented;
- b. Continuously monitor and evaluate the progress of the implementation;
- c. Giving of feedback will be initiated;
- d. Collaborate with the other members of the school organization who are part of the implementation of the program; and
- e. Constant and continuous implementation for improvement.

Post-implementation Phase . This is the last stage of the implementation. During this stage, the program implemented will be evaluated and assessed using school's developed and localized monitoring and evaluation tools and processes. Giving of feedback with regards to the positive and negative impacts of the program will be done in this stage. Planning for specific techniques that will further improve the program can also be done in this stage.

- a. Ensure that proper evaluation standards are identified during the pre-implementation phase are observed and followed;
- b. Provide feedback about the concerns, issues, gaps, and problems during the implementation; and

c. Maintain communication among and between stakeholders of the program

Matrix of Implementation

Areas of concern/s	Specific Objectives	Methodologies/ Strategies/ Activities	Persons Responsible	Time Frame	Resource Requirements	Budgetary Requirement	Source of Funds	Success Indicators	Remarks
Learners Who Lack Numeracy Foundational Skills	To improve the mathematics and numeracy performance of the learners particularly in Rapid Math Assessment [RMA).	<p>- Conduct program review and evaluation on the existing strategies/ techniques or activities that are found to be helpful in the development of the learners' numeracy skills.</p> <p>Apply interactive learning strategies such as the use of :</p> <p>Game-based activities</p> <p>Manipulatives</p>	<p>School heads</p> <p>Teachers</p> <p>Parents</p> <p>Stakeholders</p>	Whole year round	<p>Reports and evaluation sheet of the Early Grade Math Assessment or Rapid Math Assessment</p> <p>Improved Bingo Cards that contain number 1 to 100.</p> <p>Improved rollette that contains number 1 to 100.</p> <p>Dice</p> <p>Manipulatives such as</p>	2,000.00	MOOE	The number of learner who are numerates will increase.	

					counters, blocks, Plastic bottle caps in any color				
Early Language Literacy and Numeracy [ELLN] Program	To ensure that schools management communicates information about the numeracy and reading performance among the learners to the parents and other Stakeholders	Present to the parents and other stakeholders the various programs that will enhance the numeracy and reading skills of the learners. Provide information materials and medium to effectively communicate to the stakeholders and other authorities who can help the numeracy and reading performance of the learners	Teachers School Heads Parents Parents Stakeholders	All year long	Information material like leaflets, brochures, or it could be posted through class's fb page or group chats.	2,000.00	MOOE	All information needed to be relayed to the stakeholders and support are given to ensure program success	
Learner's attitude towards	To develop the habit of studying	Conduct school wide	teachers	All year long	Teaching and Mentorin	2,000.00	PTA funds	Activities are conducted and	

mathematics and poor study habits	among learners to create a positive impact to their performance.	strategies that are applicable to the school environment. Home Mentoring and many other localized program	School Heads Stakeholder		g materials			launch as planned	
Teacher's needs for relevant training	To capacitate teachers with varied techniques and strategies in teaching math	Conduct School Learning Action Cell (SLAC) on the effective teaching of math Have the master teacher /teacher who is expert in the field of reading to model/ demonstrate on how to teach reading effectively	School Heads Master Teacher Teachers	Whole year round	Teacher's Self Assessment Checklist on the effectiveness in teaching SLAC Plan	500.00	MO OE	SLAC is religiously implemented and properly documented. Literacy rate of the school improves .	
Intensify parental involvement in different learning programs	To improve the reading partnership among parents, school and stakeholders	Conduct conference to parents and stakeholders. Provide coordination activities with the	Teachers School Heads Parents Stakeholders	Whole year round	Record and minutes of parent/stakeholders' conference	2,000.00	MO OE & PTA funds	Number of commitment partners and stakeholders are completed	

		parents and stakeholders on the programs that will improve the numeracy performance of the learners							
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CHAPTER 5

SUMMARY, FINDINGS, CONCLUSION, AND RECOMMENDATION

This chapter presented the summary, findings, conclusion, and recommendation. Thus, it emphasized the implementation of an action plan as the output of the study.

SUMMARY

This section summarized the main idea of the study. This provided the research road map how this study was realized to undergo so that she would be able to capture the whole context of scholarly work.

This study was covered the teachers and learners. There was a total of 120 respondents, composed of four teachers and 114 learners were participants in this study. A descriptive method was utilized and the statistical treatment such as simple percent, weighted mean, t-test paired variables, and Chi -square represented the interpretation of the variables of the respondents. This statistical treatment was used to obtain the conclusion based on the findings and interpretation of data.

This also determined the profile of the teachers in terms of their highest educational attainment, number of years in teaching and number of relevant trainings attended. extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities and initiative and independent learning; level of learners' performance in mathematics

based on rapid mathematics assessment in term of BOSY results; significant differences in the learners' performance in mathematics between the RMA BOSY and EOSY results; significant relationship between the extent of efficacy of game-based learning and the performance of the grade 6 learners in mathematics, and challenges met by the teachers in utilizing game-based learning in mathematics. Hence, the output of this study was an action plan.

FINDINGS

The following findings were obtained based on data gathered, statistically analyzed, and interpreted.

Profile of the Teachers

This part highlighted the profile of the teachers in terms of their highest educational attainment, number of years in teaching and number of relevant trainings attended

Highest educational attainment. The data highlighted that there were four or 66.67 percent of the teachers who have earned units in masteral degree, two or 33.33 percent of the teacher who had a bachelor's degree only.

Number of years in teaching. The data demoted that there were four or 66.67 percent of the teachers had their length of teaching experience ranging more than 10 years, two or 33.33 percent of the teachers had their length of teaching experience ranging seven to ten years.

Number of relevant trainings attended. The data highlighted that majority of the teachers were four or 66.67 percent who had attended 10 and above

relevant trainings, two teachers or 33.33 percent of the teachers who had attended seven to nine relevant trainings.

Extent of Efficacy of Game-Based Learning as Perceived by the Learners

This portion provided the overall weighted mean of the extent of efficacy of game-based learning as perceived by the learners as to self-management skills, openness to learning opportunities, and initiative and independent learning was rated 3.36 classified as very high extent.

Self-management skills. The data revealed that the general weighted mean of self-management skills was rated 3.36 categorized as very high extent. The highest rating among the indicator statement was “I respect my classmates’ ideas” had rated 3.78 categorized as very high extent. The second in rank among indicator was “I finish the tasks on time” had rated 3.40 categorized as very high extent, and the lowest among the indicator statement was “I can manage myself well during collaborative activities” had rated 3.09 categorized as high extent.

Openness to Learning Opportunities. The data denoted that the general weighted mean of all indicators on the openness to learning opportunities was rated 3.36 categorized as very high extent. The highest rating among the indicator statement was “Game -based learning develops my critical thinking skills” had rated 3.63 categorized as very high extent. The second in rank among indicator was “I can work with peers collaboratively without pressure” had rated 3.61 categorized as very high extent, and the lowest among the indicator statement was “I learn from my mistakes and accepts advice from my groupmates” had rated 3.09 categorized as high extent.

Initiative and Independent Learning. The data highlighted that the general weighted mean of all indicators on the initiative and independent learning was rated 3.35 categorized as very high extent. The highest rating among the indicator statement was “I evaluate my own performance” had rated 3.79 categorized as very high extent. The second in rank among indicator was “I can find out information myself” had rated 3.41 categorized as very high extent, and the lowest among the indicator statement was “I am aware of my limitations” had rated 3.03 categorized as high extent.

Performance of the Grade 6 Learners in Mathematics in Relation to Rapid Mathematics Assessment (RMA) BOSY and EOSY Results.

This part presented the data on the performance of the grade 6 learners in mathematics in relation to Rapid Mathematics Assessment (RMA) BOSY and EOSY results.

BOSY result. The data revealed that the highest number of learners obtained the performance in mathematics were 64 (56.14) percent categorized as low proficient; the second highest number learners were 23 (20.18) percent which was categorized as nearly proficient, and the least number of learners was one (0.88) percent which was categorized as highly proficient.

EOSY result. The data indicated that the greatest number of learners obtained the performance in mathematics were 50 (43.86) percent which was categorized as nearly proficient, the second highest number learners were 22 (19.30) percent which was categorized as proficient, and the least number of learners were six (5.26) percent which was categorized as not proficient.

Significant Differences in the Learners' Performance in Mathematics Between the RMA BOSY and EOSY Results

The data revealed that the computed t-value was 9.977 and the critical value obtained from the table with degree of freedom of 113 at 0.05 degree of significance was 1.986. Since, the computed t-value was greater than the critical value. Hence, the null hypothesis was rejected. Thus, the interpretation was significant.

Significant Relationship Between the Extent of Efficacy of Game-Based Learning and the Performance of the Grade 6 Learners in Mathematics

The data revealed that the computed t-value was 9.977 and the critical value obtained from the table with degree of freedom of 113 at 0.05 degree of significance was 1.986. Since, the computed t-value was greater than the critical value. Hence, the null hypothesis was rejected. Thus, the interpretation was significant.

Challenges Met by the Teachers in Utilizing Game-Based Learning in Mathematics

The data revealed that three of the challenges indicators were rated as highly challenging and three of the indicators were rated as moderately challenging with the general weighted mean was 3.42 rated as highly challenging. The highest among the challenges indicator statement as stated "Behavioral and attitudinal barrier" had rated as highly challenging with the weighted mean of 3.83. The second highest of the indicator statement as stated "Slow internet connection" has rated as highly challenging with the weighted mean of 3.75. The

third highest of the indicator statement as stated “Games literacy” had rated as highly challenging with the weighted mean of 3.65, and the least challenged among the indicator statement as stated “Teachers’ incognizance of the game-based learning activities and games literacy” had rated as moderately challenging with the weighted mean of 3.05.

CONCLUSION

Based on the findings of this study, it was concluded that the overall weighted mean of all indicators in overall weighted mean of the extent of efficacy of game-based learning as perceived by learners was rated very high extent. The results suggested that the game-based learning promotes learners’ responsibility , motivation, collaboration, critical thinking, and active participation making it a valuable supplementary approach to support holistic learning and learner independence. In addition, the performance of the learners in mathematics based on RMA BOSY and EOSY results was the number of learners categorized as not proficient and low proficient has decreased and the number of learners obtain the level of proficient and highly proficient have increased. The teaching methods, curriculum, interventions and the integration of the game-based learning implemented successfully helped learners develop their numeracy skills. Further, findings revealed that there was a significant mean difference in the learners’ performance in mathematics between the RMA BOST and EOSY results. This This indicates that the curriculum, teaching methods, resources and integration of the

game-based learning are successfully addressing learners' learning needs of improving the performance in mathematics.

Furthermore, findings showed that there is no significant relationship between the extent of efficacy of game-based learning and the performance of grade 6 learners in mathematics. However, teachers faced challenges on the behavioral and attitudinal barriers, slow internet connectivity and game literacy.

RECOMMENDATION

In light of the findings and conclusion of this investigation, it is hereby suggested that the action plan may be implemented and adopted. For the reason that the integration of game-based learning may help improve the level of performance of the learners in mathematics, and at the same time the learning gaps can be addressed strategically by consultation and collaboration with the parents, school officials and the stakeholders as well.

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APPENDICES

APPENDIX A₁

Transmittal letter for the Schools Division Superintendent

Republic of the Philippines
Department of Education
Region VII, Central Visayas
DIVISION OF LAPU-LAPU CITY

March 8, 2026

MARILYN S. ANDALES, Ed.D, CESO V
Schools Division Superintendent
Division of Lapu-Lapu City

Madame:

Peace Be with You!

The researcher is currently conducting a research study on “Game-Based Learning and Performance of the Grade Six Learners in Mathematics: An Intervention Plan”, as partial fulfillment of the requirements for the degree Master of Arts in Education (MAEd) major in Administration and Supervision at Felipe R. Verallo Memorial Foundation College Incorporated.

In this connection, she would like to request permission from your good office to allow her to conduct a survey to the grade six learners and teachers at Gun-ob Elementary School, Lapu-Lapu City.

Rest assured that the data gathered from this study will be taken with utmost confidentiality.

Your favorable consideration on this request is highly appreciated. Thank you so much.

Very truly yours,

DARLINE B. CUIZON
Researcher

Noted:

GERARDO S. MANTOS, Ed. D.
Adviser

Approved by:

MARILYN S. ANDALES, Ed. D, CESO V
Schools Division Superintendent

APPENDIX A₂

Transmittal Letter for the Public Schools District Supervisor

Republic of the Philippines
Department of Education
Region VII, Central Visayas
DIVISION OF LAPU-LAPU CITY

March 8, 2026

CZARINA RITZKO J. SAGARINO
PSDS, District VI
Division of Lapu-Lapu City

Madame:

Peace Be with You!

The researcher is currently conducting a research study on “Game-Based Learning and Performance of the Grade Six Learners in Mathematics: An Intervention Plan”, as partial fulfillment of the requirements for the degree Master of Arts in Education (MAEd) major in Administration and Supervision at Felipe R. Verallo Memorial Foundation College Incorporated.

In this connection, she would like to request permission from your good office to allow her to conduct a survey to the grade six learners and teachers at Gun-ob Elementary School, Lapu-Lapu City.

Rest assured that the data gathered from this study will be taken with utmost confidentiality.

Your favorable consideration on this request is highly appreciated. Thank you so much.

Very truly yours,

DARLINE B. CUIZON
Researcher

Noted:

GERARDO S. MANTOS, Ed. D.
Adviser

Approved by:

CZARINA RITZKO J. SAGARINO
PSDS, District VI

APPENDIX A₃

Transmittal Letter for the School Head

Republic of the Philippines
Department of Education
Region VII, Central Visayas
DIVISION OF LAPU-LAPU CITY

March 8, 2026

ARLENE T. SUMALINOG
School Head
Gun-ob ES

Madame:

Peace Be with You!

The researcher is currently conducting a research study on “Game-Based Learning and Performance of the Grade Six Learners in Mathematics: An Intervention Plan”, as partial fulfillment of the requirements for the degree Master of Arts in Education (MAEd) major in Administration and Supervision at Felipe R. Verallo Memorial Foundation Incorporated.

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Your favorable consideration on this request is highly appreciated. Thank you so much.

Very truly yours,

DARLINE B. CUIZON
Researcher

Noted:

GERARDO S. MANTOS, Ed. D.
Adviser

Approved by:

ARLENE T. SUMALINOG
School Head

APPENDIX B

A QUESTIONNAIRE OF THE STUDY ON GAME-BASED LEARNING AND PERFORMANCE OF THE GRADE 6 LEARNERS IN MATHEMATICS: AN INTERVENTION PLAN

To the Respondents:

Greetings!

The researcher is conducting a research study entitled “Game-Based Learning and Performance of the Grade 6 Learners in Mathematics: An Intervention Plan”. In light of this, the researcher is heartily asking for your time and cooperation in answering the questionnaire intended for this study. It is therefore guaranteed that your responses will be provided with highest degree of confidentiality of the data collected and be used for specified and legitimate purpose only.

Your utmost cooperation is highly appreciated. Thank you so much.

Researcher

PART I: PROFILE OF THE RESPONDENTS

Directions: For each question, please select only one answer. If more than one answer is true for you. Kindly check the box of the answer that fits best.

1. Highest Educational Attainment

- ☐ Doctorate Degree
- ☐ With Doctorate Units
- ☐ Masters Degree
- ☐ With MA Units
- ☐ Bachelors Degree

2. Number of years in teaching

- ☐ Ten years and above
- ☐ Seven to nine years
- ☐ Four to six years
- ☐ One to three years

3. Number of relevant trainings attended

- ☐ Ten and above
- ☐ Seven to nine
- ☐ Four to six

- ☐ One to three
☐ None

PART II. EXTENT OF EFFICACY OF GAME-BASED LEARNING AS PERCEIVED BY THE LEARNERS ; Adopted (Velasquez, et al., 2024)

Directions: Answer the question below and put a check mark on the column which best describes the extent of efficacy of game- based learning.

Weight	Category	Verbal description
4	Very High Extent (VHE)	The indicator greatly affected the performance of the learners.
3	High Extent (H E)	The indicator moderately affected the performance of the learners.
2	Low Extent (LE)	The indicator slightly affected the performance of the learners.
1	Very Low Extent (VLE)	The indicator has not affected the performance of the learners.

<i>Indicators</i>	VHE (4)	HE (3)	LE (2)	VLE (1)
<i>Self-management Skills</i>				
I am organized while doing game-based activities.				
I finish the tasks on time.				
I need minimal help in solving some problems .				
I can manage myself well during collaborative activities.				
I respect my classmates' ideas.				
<i>Openness to Learning Opportunities</i>				
I learn from my mistakes and accepts advice from my groupmates.				

I want to learn new information.				
I can work with peers collaboratively without pressure.				
Game -based learning develops my critical thinking skills.				
I become more technologically literate because of interactive games during class.				
<i>Initiative and Independent Learning</i>				
I evaluate my own performance.				
I am aware of my limitations.				
I like to solve mathematical problems and puzzles..				
I enjoy and have positive attitude towards learning activities.				
I can find out information myself.				

PART II. PERFORMANCE OF THE GRADE SIX LEARNERS IN MATHEMATICS
Adopted, Rapid Mathematics Assessment [RMA] Toolkit, (DO 18, 2025).

Instructions:

You will take a test with 40 questions. These questions are of two types:

Some items will ask you to choose the best answer. For these questions, write the letter of your answer on the answer sheet provided.

Other items will ask you to write your answer. This could be a number, a word, an explanation, or a computation. There are spaces provided in the answer sheet for you to write your answers.

You can write your explanation in English or Filipino.

Sometimes, the question will come after a story or illustrations. Make sure you read everything carefully so you don't miss the question.

Do not write anything on this material.

You have one hour to finish the test. Do your best!

1. Multiply.

$$\begin{array}{r} 316 \\ \times \quad 7 \\ \hline \end{array}$$

- A. 21 742
- B. 21 142
- C. 2 212
- D. 2 194

2. Tessa is making a bracelet using colorful beads with different shapes. She started with the given pattern.



What should be the next three beads in Tessa's

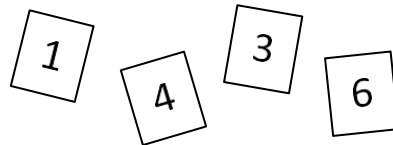
bracelet? A.



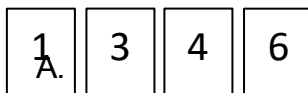
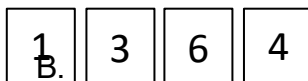
D.



3. Ara arranged the number cards below to form a number that, when added to 2587, gives the greatest sum.



What is this number?



6 C.	4	1	3
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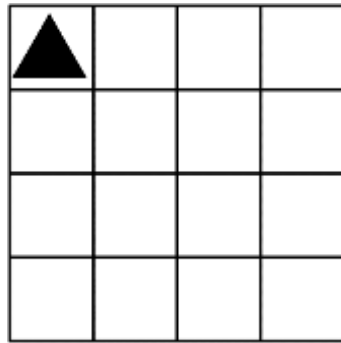
6 D.	4	3	1
---------	---	---	---

- 4 .Ralph and his friends tossed a coin 10 times. The results are shown below.

Toss	Result
1st	Head
2nd	Head
3rd	Tail
4th	Tail
5th	Head
6th	Tail
7th	Tail
8th	Head
9th	Head
10th	Head

How many times did they get a head?

- A. 4
 - B. 5
 - C. 6
 - D. 10
5. Slide the triangle 2 units to the right and 3 units down. Draw on the grid its final position.



6. If N is any number, which of the following would give the same answer as $8 \times N$?

- a. $8 + N$
- b. $8 - N$
- c. $N \times 8$
- d. $N \div 8$

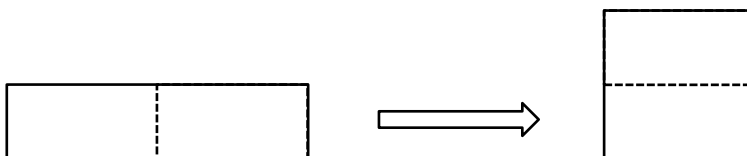
7. Mariz has one loaf of bread. She gives $\frac{3}{8}$ of the loaf to her friend. What part of the bread does Mariz have left?

- A. $\frac{2}{7}$ B. $\frac{2}{8}$ C. $\frac{5}{8}$ D. $\frac{4}{9}$

8. Shown below are 5 whole regions of the same size. Shade $\frac{3}{2}$ of a region.



8. A rectangular cutout is cut into two equal parts to form a square cutout as shown.



Which is true about the areas of the rectangle cutout and the square cutout?

- A. The area of the square cutout is four times the area of the rectangle cutout

- B. The area of the square cutout is two times the area of the rectangle cutout.
- C. The area of the square cutout is one-half the area of the rectangle cutout.
- D. The area of the square cutout is the same as the area of the rectangle cutout.

9. Fill in the blank.

$$7\,500 - 1\,000 = 7\,000 - \underline{\hspace{2cm}}$$

10. How much more is 100×18 than 100×17 ?

- A. 1
- B. 17
- C. 18
- D. 100

11. Fill in the blank.

$$56 \div \underline{\hspace{2cm}} = 7$$

12. Alex saw the following objects in the classroom. Which of these objects shows an obtuse angle?



13. A school has collected a total of ₱8,700.00. If this amount is to be divided equally among the six grade levels, how much would each grade level receive?

- A. ₱ 143.00
- B. ₱ 145.00
- C. ₱1,100.00
- D. ₱1,450.00

14. Subtract:

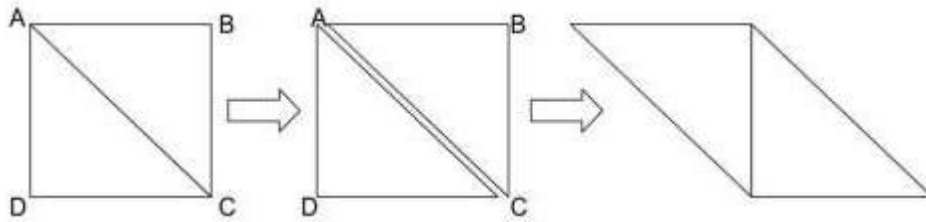
$$900\ 000 - 87\ 246$$

- A. 87 246
- B. 923 864
- C. 823 864
- D. 812 754

15. Which of the following has the same mass as one-half kilogram of flour?



16. Square ABCD is cut along line segment AC to form the figures as shown.



What type of quadrilateral is formed? _____

Explain your answer.

17. Aling Lea will mix 1 000 mL of water and 750 mL of orange juice.
Which container can hold the mixture?

18. Add.

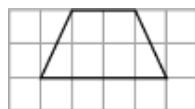
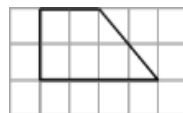
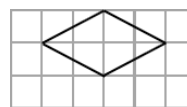
$$452\,042 + 38\,594$$

- A. 490 036
- B. 490 636
- C. 737 982
- D. 837 982

19. Study the parallelogram below .



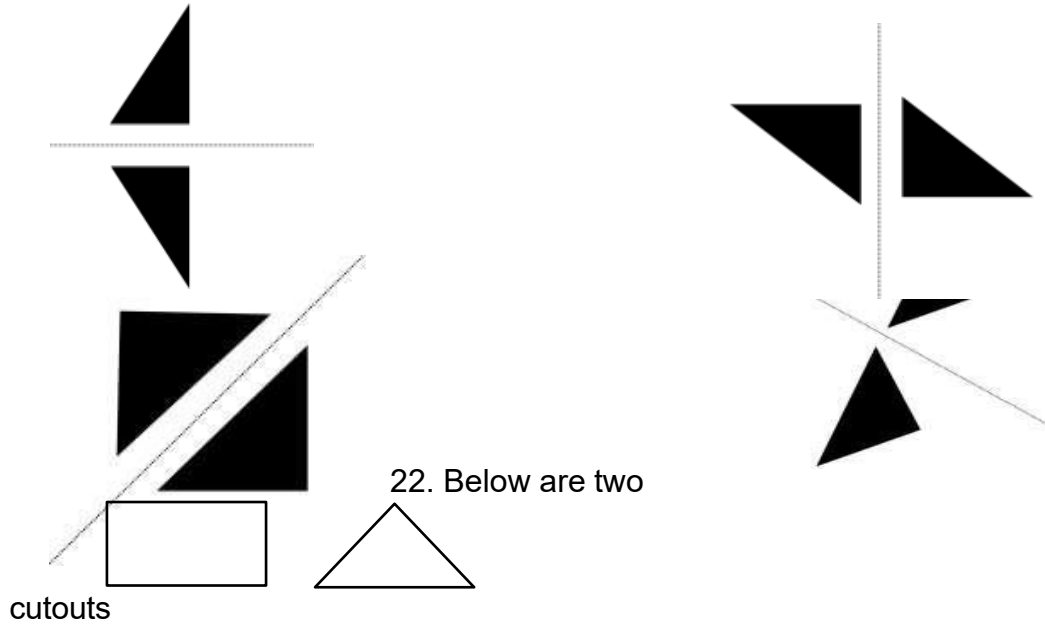
Which of the following quadrilaterals has the same perimeter as the parallelogram?



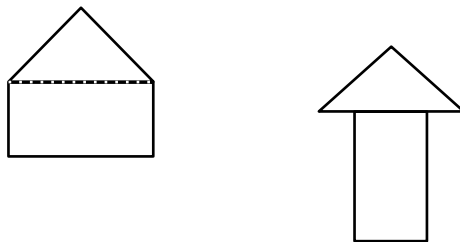
20. Perform the indicated operation. Show your solution and express your answer in its simplest terms.

$$- \quad - \frac{4}{6} + \frac{3}{9}$$

21. Which of the following figures does NOT show a reflection (flip)?



These cutouts are used to form the figures shown.



Are the perimeters of the figures the same?

Explain your answer.

23. Tito walks from his house to school for one-half of an hour. If he leaves his house at 6:05 A.M., what time will he arrive at school?

- | | |
|--------------|--------------|
| A. 6:20 A.M. | C. 6:35 A.M. |
| B. 6:30 A.M. | D. 6:55 A.M. |

24. Jason used $1 \frac{5}{6}$ m of ribbon for his mathematics project and $2 \frac{1}{3}$ m for

His Science project . How many meters of ribbon did Jason use in total?

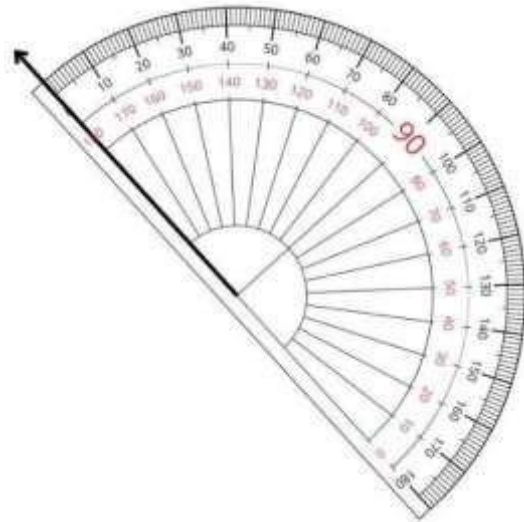
A. $4 \frac{1}{6}$

B. $3 \frac{6}{9}$

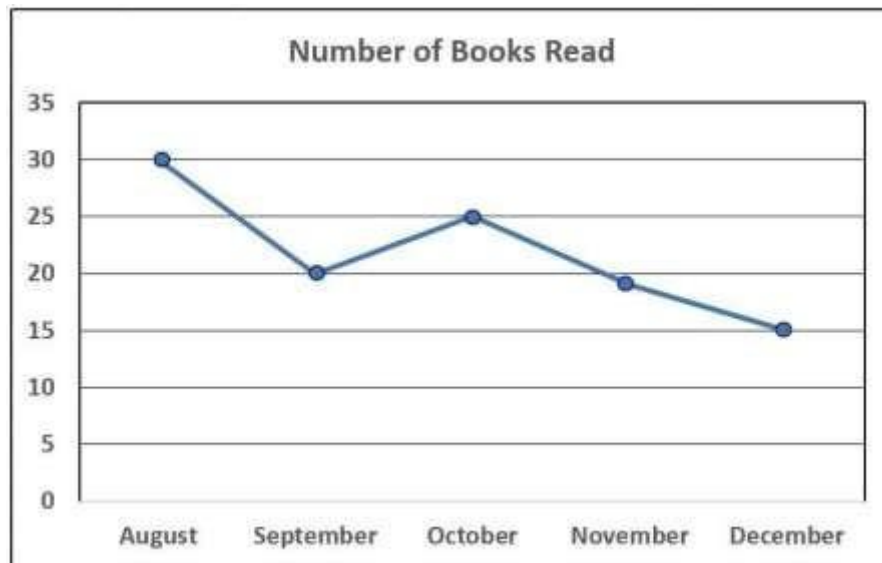
C. $2 \frac{1}{3}$

D. $2 \frac{1}{9}$

25. Mar wants to draw a 140-degree angle. He has already drawn one side as shown. Complete Mar's drawing.



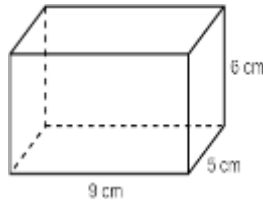
26. The number of books read by the Grade 5 learners is shown in the graph.



In which months did the largest decrease in the number of books read happen?

- A. August to September
- B. September to October
- C. October to November
- D. November to December

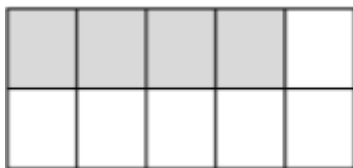
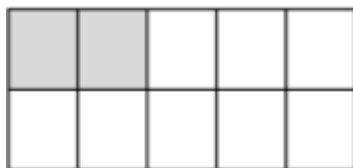
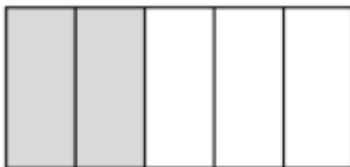
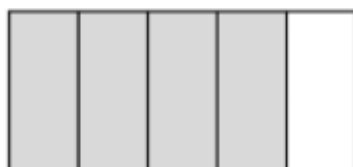
27. Marie wants to wrap a box with the given dimensions.



What is the least amount of wrapper she needs?

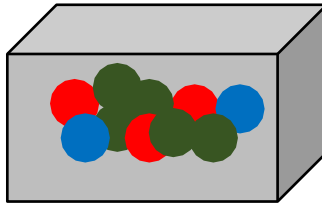
- A. 129 cm^2
- B. 135 cm^2
- C. 258 cm^2
- D. 270 cm^2

28. Which shaded parts of the figure below represent 0.8?



For **29** and **30** refer to the given situation below.

There are 3 red marbles, 2 blue marbles, and 5 green marbles in a box.



29. If Aldrin picks one marble from the box, what are the chances that he will pick a blue marble? _____

30. What is the likelihood that he will get a green marble than a blue marble?

- A. It is sure that he will get a green marble.
- B. It is equally likely that he will get a green or a blue marble.
- C. It is less likely that he will get a green marble than a blue marble.
- D. It is more likely that he will get a green marble than a blue marble.

31. Rose needs school supplies for the new school year. She buys 9 notebooks at ₱24.25 each and 4 pencils at ₱9.50 each. How much does

Rose need to pay in total?

- A. ₱142.50
- B. ₱182.50
- C. ₱256.25
- D. ₱438.75

32. Perform the indicated operation. Show your solution and express your answer in its simplest terms.

$$\frac{4}{6} \div \frac{2}{3}$$

33. Justin bought a shirt for ₱249.25 and a pair of shorts for ₱179.25. How much change should Justin receive if he gave the cashier a 1 000-peso bill? Show your solution.

34. What is the value of the digit 7 in the number 281.379?

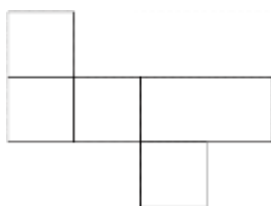
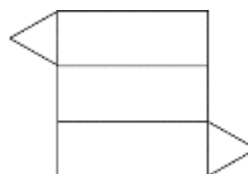
- A. 7 tens
- B. 7 ones
- C. 7 tenths
- D. 7 hundredths

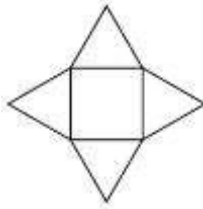
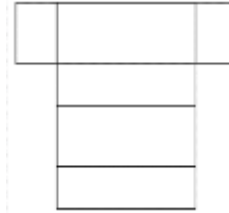
35. Divide:

$$5.68 \div 8$$

- E. 71.0
- F. 7.1
- G. 7.0
- H. 0.71

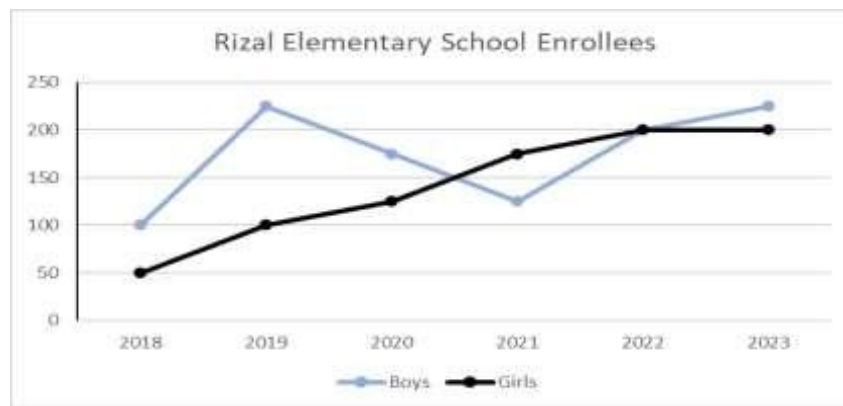
36. Which of these would NOT form a prism when folded?





For numbers **37a** and **37b**, refer to the graph below.

The graph shows the enrollees at Rizal Elementary School over six years.



37a. Which of the following years has the greatest number of enrollees?

- A. 2019
- B. 2020
- C. 2021
- D. 2022

37b. In which year is the number of girls and boys enrollees the same?

- A. 2020
- B. 2021
- C. 2022
- D. 2023

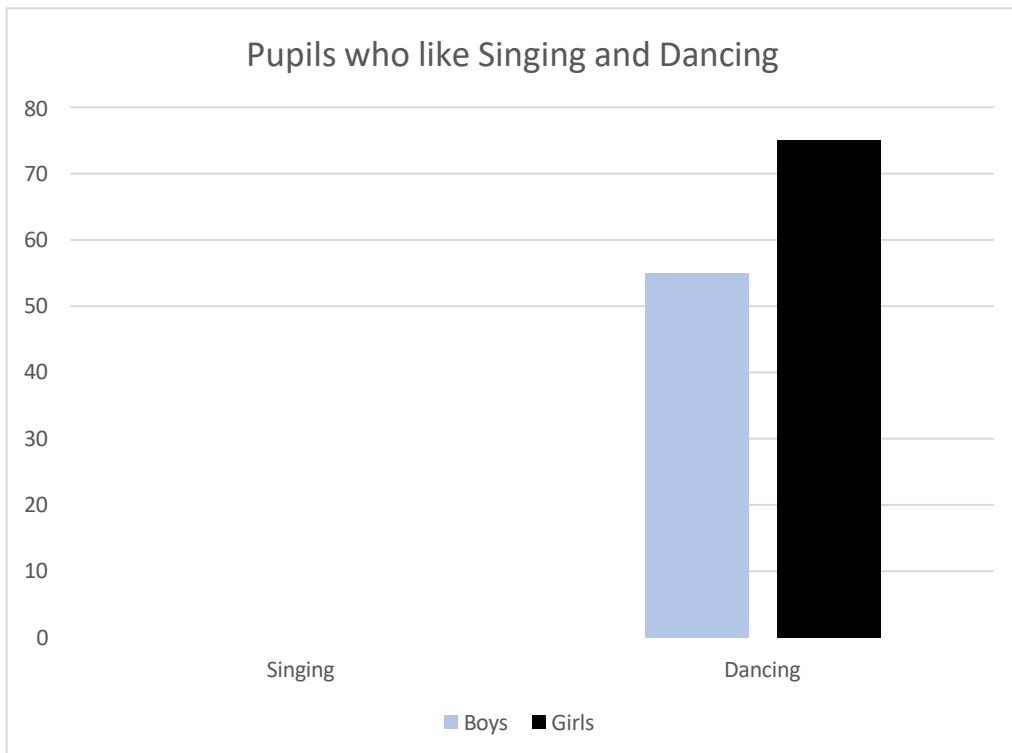
38. A bibingka recipe requires $\frac{3}{4}$ cup of coconut milk. If Maria wants to make $\frac{1}{2}$ of the recipe, how much coconut milk will she need?

- A. $\frac{1}{4}$ cup
- B. $\frac{3}{8}$ cup
- C. $\frac{5}{4}$ cups
- D. $\frac{3}{2}$ cups

39. Perform the indicated operations. Show your solution.

$$500 - [(15 \times 10) + (\frac{1}{2} \times 95)]$$

40. The graph below shows the number of Grade 4 pupils who likes singing and dancing.



How many Grade 4 pupils like dancing more than singing?

- A. 130
- B. 60
- C. 45
- D. 20

PART III. CHALLENGES MET BY THE TEACHERS , Adopted (Yaman, et. al.,2024)

Directions: Read each statement carefully. Put a check (✓) on the corresponding column of your choice.

Weight	Range	Category	Verbal description
4	3.25- 4.00	Highly Challenging (HC)	The challenges are always experienced by the teachers.
3	2.50- 3.34	Moderately Challenging(MC)	The challenges are frequently experienced by the teachers.
2	1.75- 2.49	Slightly Challenging (SC)	The challenges are sometimes experienced by the teachers.
1	1.00- 1.74	Not Challenging at All (NCA)	The challenges are not experienced by the teachers.

Challenges indicators	HC (4)	MC (3)	SC (2)	NCA (1)
Behavioral and attitudinal barriers				
Slow internet connection				
Games literacy				

Insufficient time				
Teachers' incognizance of the game-based learning activities and games literacy				
Lack of digital tools				

CURRICULUM VITAE

CURRICULUM VITAE



Darline P. Cuizon
Blk6 Lot 26, Deca5, Sudtunggan, Basak, Lapu-lapu City
darline.cuizon@frv-college.ph
9458840367

Personal Information

Sex	:	Female
Birthdate	:	July 5, 1983
Birth Place	:	Lapu-lapu City
Citizenship	:	Filipino
Civil Status	:	Married
Religion	:	Roman Catholic

Educational Attainment

Course	School	Address	Date Graduated
Master of Arts in Education Major in Management and Supervision	Felipe R. Verallo Memorial Foundation Inc.	Clotilde Hills, Dakit, Bogo City	2024
Bachelor of Elementary Education	University of Cebu-Lapu-lapu and Mandaue	A.C. Cortes Ave, Mandaue City	2007
Seconday Education	Saint Alphonsus Catholic School	Lapu-lapu City	2000
Elementary Education	Sabang Elementary School	Lapu-lapu City	1996

Government Licensure Examination

Title	Rating	Place of Examination	Date
Licensure Examination for Teachers (LET)	79.6	Cebu City	Aug-07

History of Employment

Position	Agency	Address	Inclusive Date
Academic Coordinator- Elem.	San Roque College De Cebu- Cordova	Gabi, Cordova, Cebu	2007-2013
Teacher III	DepEd	Lapu-lapu	2013-present

Training and Seminar Attended

Title	Sponsoring Agency	Venue	Date
Lead the Way :Crafting Compelling Leads for School JournalismL	DepEd	Gun-ob, Lapu-lapu City	22-Aug-25
Enhancing Teaching Excellence: Content and Pedagogy Training for elementary Teachers	DepEd	Pajo National High School	15-Nov-25
Bridging Gaps , Building Excellence : Strengthening Assessment and Instructional Practices for Literacy and Numeracy achievement	DepEd	Gun-ob Elementary School	November 19, 21 & 26, 2025
Empowering Educators: Strengthening Literacy and Numeracy, Leadership and instructional Innovation	DepEd	Gun-ob Elementary School	November 27-28, 2024