

Functional Literacy Skills of Grade 4 Learners: Basis for Developing a Literacy Enhancement Program

Blessie Mei R. Agpalo^{1*}, Christian T. Alarcon¹, John Kurt B. Bernardo¹, Hannah Faith M. Cunanan¹,
Francis C. Maniquiz¹, Cj B. Martin¹

¹*Polytechnic University of the Philippines - Cabiao Campus, Cabiao, Nueva Ecija, Philippines*

Abstract—This study aimed to assess the functional literacy skills of Grade 4 learners in selected public elementary schools in Cabiao, Nueva Ecija, as the basis for developing a Literacy Enhancement Program. Specifically, the study determined the learners' level of functional literacy in terms of reading comprehension, writing for practical purposes, and applied numeracy skills, as well as the extent of home-related and learning environment factors affecting literacy development. The study utilized a quantitative descriptive research design. The respondents consisted of 175 Grade 4 learners from Cabiao Central School, Bagong Silang Elementary School, and Palasinan Elementary School. A researcher-made Functional Literacy Assessment Questionnaire based on the Functional Literacy, Education, and Mass Media Survey (FLEMMS) framework was used as the primary instrument. Frequency, percentage, and weighted mean were employed to analyze the gathered data. Findings revealed that the overall level of functional literacy skills of the learners was Very Satisfactory, with reading comprehension obtaining the highest mean, followed by writing for practical purposes. Applied numeracy skills received the lowest mean and were interpreted as Satisfactory, indicating the need for improvement in applying mathematical concepts in real-life situations. The study also found that most learners had access to smartphones and internet connection, a dedicated study area, and parental support in learning. However, many learners spent limited time reading and did not practice reading regularly despite having a positive attitude toward reading. Based on the findings, the study concluded that although Grade 4 learners generally demonstrated a Very Satisfactory level of functional literacy, intervention remains necessary, particularly in applied numeracy skills. Therefore, the MATH-IN-ACTION Program (Mathematics in Daily Life and Practical Application) was proposed to strengthen learners' ability to apply mathematical concepts in everyday situations.

Index Terms—Functional Literacy, Reading Comprehension, Writing Skills, Applied Numeracy, Literacy Enhancement Program, Grade 4 Learners.

1. The Problem and its Setting

A. Introduction

Literacy is more than simply reading, writing, and doing basic calculations. Functional literacy refers to the ability to use these skills in real-life situations. It helps children understand

the world, solve problems, and contribute meaningfully to their communities (United Nations Educational, Scientific and Cultural Organization) institute for Statistics, 2020). For children, literacy is not only about completing school tasks but also about applying what they learn to benefit their families and surroundings.

According to the Far Eastern University Public Policy Center, the age of 10, or around the end of Grade 4, is an important stage in literacy development. At this point, learners move from simple literacy to functional literacy. By this age, basic skills such as reading, writing, and arithmetic are expected to be developed. Children who become functionally literate are better prepared to continue learning, make informed decisions, and grow into responsible members of society. In addition, Medzhidova et al. (2021) stated that functional literacy allows learners not only to acquire and master knowledge but also to apply what they have learned in practical situations, develop essential skills for effectively accessing and navigating important information sources, and connect academic concepts to real-life experiences. These abilities enable learners to use their knowledge meaningfully in everyday situations, make informed decisions, and respond appropriately to various challenges, making functional literacy a critical foundation for quality education and lifelong learning.

In the Philippines, functional literacy is measured through the Functional Literacy, Education, and Mass Media Survey (FLEMMS) conducted by the Philippine Statistics Authority. The survey assesses individuals aged 10 to 64 in their ability to read, follow instructions, and use information in everyday life. The 2024 FLEMMS revealed that over 18 million junior high school graduates are considered functionally illiterate, struggling with comprehension despite completing basic education (Bordey, 2025).

Many studies focus mainly on general reading proficiency rather than the ability to apply literacy skills in real life. National reports like the 2024 FLEMMS provide functional literacy data at the national level; while several Philippine studies examined reading and comprehension among elementary learners (Bautista, 2024; Tomas et al., 2021), no

*Corresponding author: blessiemeiagpalo@gmail.com

published studies were found specifically on the functional literacy skills of Grade 4 learners in Cabiao, Nueva Ecija. Assessing their literacy abilities and identifying areas for improvement is therefore necessary.

In accordance with the academic requirements of the Bachelor of Elementary Education (BEED) program, the researchers are authorized by the Polytechnic University of the Philippines to conduct this study. The research is undertaken with the approval of the participating school and focuses on determining the functional literacy skills of Grade 4 learners in Cabiao, Nueva Ecija. Ethical protocols are carefully observed to protect the welfare and confidentiality of the participants.

This study aims to determine the functional literacy skills of Grade 4 learners in Cabiao, Nueva Ecija and use the findings as the basis for developing a Literacy Enhancement Program to strengthen their reading, writing, and arithmetic skills.

B. Theoretical Framework

This study is anchored on the Sociocultural Theory of Lev Vygotsky, which emphasizes that learning is fundamentally a social process mediated by language, culture, and interaction. Vygotsky posited that cognitive development occurs first at the social level through interaction with more knowledgeable others and is later internalized by the learner.

In the context of Grade 4 learners, the development of functional literacy skills is shaped by classroom interactions, guided instruction, peer collaboration, and culturally meaningful learning experiences.

Central to Sociocultural Theory is the concept of the Zone of Proximal Development (ZPD), which refers to the difference between what a learner can accomplish independently and what can be achieved with guidance from a teacher or more capable peer. Functional literacy skills such as reading comprehension, writing for practical purposes, and applied numeracy develop most effectively when instructional activities are structured within the learner's ZPD. Through scaffolding, teachers provide temporary support such as modeling reading strategies, guiding discussions, supplying vocabulary, and offering structured writing tasks. As learners gain competence, these supports are gradually withdrawn, enabling independent performance.

Furthermore, Sociocultural Theory highlights language as the primary cultural tool for intellectual development. Literacy activities in Grade 4 classrooms, including shared reading, collaborative writing, and dialogic teaching, function as social processes through which learners construct meaning. Through interaction and participation in authentic literacy practices, learners internalize skills that allow them to use reading, writing, and numeracy in real-life situations. Functional literacy is therefore not merely the acquisition of isolated skills but the ability to apply these skills meaningfully within social and cultural contexts.

This framework assumes that Grade 4 learners transition from learning to read toward reading to learn, making social interaction and guided practice critical to their literacy development. By situating literacy instruction within learners' cultural experiences and providing structured support, teachers

facilitate the development of functional literacy skills that enable learners to participate effectively in academic and everyday tasks. Thus, Sociocultural Theory provides a lens through which functional literacy development is understood as a socially mediated, culturally embedded, and collaboratively constructed process.

C. Conceptual Paradigm

The study focuses on the functional literacy skills of Grade 4 learners in terms of reading comprehension, writing for practical purposes, and applied numeracy skills, together with home-related and learning environment factors such as access to technology, availability of a study area at home, parent or guardian support in learning, time spent reading per day, reading frequency at home, and attitude toward reading. The research process involves questionnaire validation, data gathering, scoring and tabulation, statistical analysis, and interpretation of data. Based on the findings of the study, a Literacy Enhancement Program will be developed to improve the learners' functional literacy skills.

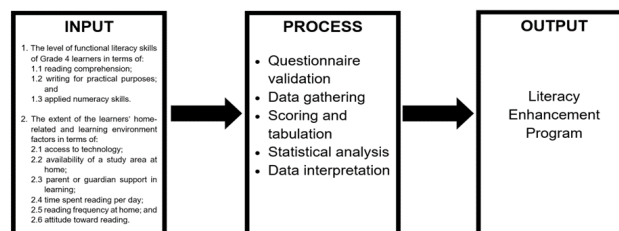


Fig. 1. Conceptual model of the study

D. Statement of the Problem

This study aims to assess the functional literacy skills of Grade 4 learners as a basis for developing a Literacy Enhancement Program.

Specifically, this study seeks to answer the following questions:

- What is the level of functional literacy skills of Grade 4 learners in terms of:
 - reading comprehension;
 - writing for practical purposes; and
 - applied numeracy skills?
- What is the extent of the learners' home-related and learning environment factors in terms of:
 - access to technology;
 - availability of a study area at home;
 - parent or guardian support in learning;
 - time spent reading per day;
 - reading frequency at home; and
 - attitude toward reading?
- Based on the findings, what Literacy Enhancement Program can be developed to improve the functional literacy skills of Grade 4 learners?

E. Scope and Limitation of the Study

This study focuses on assessing the functional literacy skills of Grade 4 learners in selected public elementary schools in Cabiao, Nueva Ecija, namely Cabiao Central School, Bagong Silang Elementary School, and Palasinan Elementary School

during the School Year 2025–2026. Specifically, the study examines the learners' level of functional literacy skills in terms of reading comprehension, writing for practical purposes, and applied numeracy skills. In addition, the study also determines the extent of selected home-related and learning environment factors that may influence learners' functional literacy skills, particularly access to technology, availability of a study area at home, parent or guardian support in learning, time spent reading per day, reading frequency at home, and attitude toward reading as important factors in learning development.

The data gathered from the study will serve as the basis for developing a Literacy Enhancement Program intended to improve the functional literacy skills of Grade 4 learners and address identified learning gaps.

This study is limited only to selected public elementary schools in Cabiao, Nueva Ecija, and does not include private schools or learners from other grade levels. Furthermore, while a Literacy Enhancement Program will be proposed based on the findings of the study, its implementation and evaluation are not covered within the scope of this research.

F. Significance of the Study

This study is significant because it aims to assess the functional literacy skills of elementary learners and use the findings as the foundation for developing a literacy enhancement program.

For teachers, the results will serve as a diagnostic tool to help them identify specific areas where students struggle, allowing for the implementation of appropriate instructional strategies and remedial activities.

For school administrators, the study will provide valuable and relevant data that can serve as a basis for curriculum development, resource allocation, and teacher training programs focused on improving learners' literacy skills and addressing their specific learning needs.

For parents and guardians, the study will help them gain a deeper understanding of their children's functional literacy abilities, including their strengths and areas that may need improvement, while encouraging greater involvement, guidance, and support in their children's learning and literacy development at home.

Lastly, for future researchers, this study will serve as a reference for further investigations into literacy development and intervention design for future educational research and practice.

Overall, the research contributes to the enhancement of basic education by providing a concrete basis for developing a literacy enhancement program that fosters functional literacy among young learners.

G. Definition of Terms

The researchers used operational definition as follows:

Applied Numeracy Skills. The ability to apply basic mathematical concepts such as operations, time, money, measurement, and problem-solving in real-life situations involving computation and interpretation of numerical data.

Functional Literacy. The ability of Grade 4 learners to read,

write, compute, and apply information in real-life situations. It includes performance in reading comprehension, writing for practical purposes, and applied numeracy skills using a researcher-made Functional Literacy Assessment Questionnaire based on the FLEMMS framework.

Reading Comprehension. The ability to understand, interpret, and analyze written texts, identify key ideas, and answer questions based on short passages involving literal understanding, inference, and interpretation.

Writing for Practical Purposes. The ability to construct clear, appropriate, and grammatically correct sentences used for everyday communication such as requests, reminders, instructions, and short messages, focusing on correctness, clarity, organization, and appropriateness of expression.

2. Review of Literature and Studies

This section presents a review of existing literature and studies relevant to the research topic. It provides a deeper understanding of the concepts, theories, and findings that have already been established by the other researchers.

Reading Comprehension

In the Philippines, literacy has evolved from simply decoding words to a broader understanding of functional literacy, which includes comprehension, synthesis, and practical application of knowledge. The Department of Education (DepEd, 2025) emphasizes that functional literacy goes beyond reading, writing, and arithmetic requires the ability to understand and use information effectively. Foundational literacy alone is insufficient; learners must develop comprehension and critical thinking to bridge the gap to functional literacy.

Low reading proficiency has been linked to inadequate functional literacy. Reports such as DepEd Bataan Publications (2025) and the 2024 FLEMMS indicate that decoding skills alone do not ensure meaningful use of information. Studies by Tomas et al. (2021) and Larioque (2019) highlight that limited vocabulary, weak decoding skills, and insufficient background knowledge contribute significantly to comprehension difficulties. Bautista (2024), using the Functional Literacy Assessment Tool (FLAT), confirmed that poor comprehension in Grades 4–6 correlates with lower functional literacy. Collectively, these studies show that comprehension is the bridge from learning to read to reading to learn. Theoretical perspectives further underscore the importance of comprehension. Cayubit (2012, as cited in Larioque, 2019) noted that children with strong reading skills are better positioned for academic success. Bagolong and Usop (2021) emphasize that phonemic awareness alone is not enough; learners must develop comprehension to achieve meaningful literacy outcomes. Curriculum initiatives by DepEd (2025) support this view by promoting critical thinking and deeper comprehension.

Practical applications are also evident. Lucas et al. (2021) argue that strong reading skills allow learners to process academic and everyday information efficiently, while Connolly (2025) highlights that comprehension tied to real-world contexts improves retention and application. Cain and Oakhill (2015) identify vocabulary and syntax as major barriers to

comprehension, a view supported by Foorman *et al.* (2015) through the Simple View of Reading, which emphasizes the interaction between decoding and language understanding. The OECD Skills Outlook (2019) adds that functional literacy is socially and practically oriented, requiring learners to navigate complex information.

Fluency is closely linked to comprehension and functionality, as fluent readers can focus more on understanding and applying information rather than simply decoding words. Rasinski and Padak (2016) note that automaticity in reading is essential for understanding everyday texts, such as instructions, announcements, and news. The NAEP (2015) framework also emphasizes the importance of applying comprehension skills to real-life tasks, while Eastern Washington University (2022) connects reading comprehension to problem-solving, memory, and critical thinking. Similarly, Spencer and Wagner (2018) describe comprehension as being influenced by decoding, oral language, and self-regulation.

This perspective is also supported by Amanzhol *et al.* (2024) in the context of Kazakhstan, demonstrating that literacy development is shaped by both learners' abilities and the educational environments that support their learning and development across different educational contexts and experiences.

A. Writing for Practical Purposes

Writing skills develop in the context of both home literacy and school instruction. Su, Fan, Wu, Qiao, and Zhou (2022) found that formal literacy activities, such as parental guidance in writing, strongly influence younger students, while informal experiences like library visits shape older students' writing abilities. Ulu (2019) similarly reported that diary writing and reading habits improve narrative skills in Grade 4 learners.

Teachers' instructional approaches also significantly impact writing development. DeBaryshe (2023) showed that professional development for teachers enhanced emergent writing skills in children, while Romano and Casupanan (2024) observed that structured interventions focusing on letter recognition, phonological awareness, and feedback improved readability among Grade 4 learners. Fitrianingrum and Aryani (2024) highlighted that school-based literacy movements strengthened vocabulary, writing structure, and idea expression.

Linguistic and cognitive factors influence writing as well. De Lemios (2023) noted that literacy in a first language (L1) predicts functional writing performance more effectively than in a second language (L2). Research in the U.S. shows that academic language, including grammar and vocabulary, develops significantly between kindergarten and Grade 4, predicting later writing competence. Ribeiro *et al.* (2025) emphasized that narrative connectedness improves with exposure to structured stories, supporting coherence in writing.

Motivation and creative engagement are also important in developing learners' functional writing skills. Turkish studies show that writing motivation correlates with performance, and systematic reviews across countries stress balancing assessment-driven tasks with imaginative composition to

enhance originality. Altındağ Kumaş (2021) demonstrated that environmental print exposure to real-world texts can improve functional writing for at-risk learners.

In the Philippine context, writing skills remain a challenge. Organisation for Economic Co-operation and Development (2019, PISA results) highlighted that Filipino learners perform below minimum proficiency levels in reading and writing literacy, reflecting difficulties in functional literacy skills. Meanwhile Binhi English Literacy Foundation (2024) and Del Mundo (2024) reported widespread functional illiteracy influenced by socioeconomic factors. Into (2024) highlighted post-pandemic gaps in coherence and grammar among learners. Localized interventions, however, such as those reported by Pinagpala Publishing Services (2024) and Campo *et al.* (2025), show that structured writing programs and targeted support can meaningfully improve writing outcomes.

Instructional materials play a key role. Imperial and Ong (2021) found that text readability affects writing development, while creative writing research emphasizes the balance between structured and imaginative tasks. These findings collectively show that writing skills can be strengthened with well-designed, context-sensitive interventions.

B. Applied Numeracy Skills

Numeracy is consistently described as an essential skill that enables learners to apply mathematical knowledge in meaningful ways. According to the Victorian Curriculum and Assessment Authority (2017), numeracy refers to the knowledge, skills, practices, and attitudes needed to use mathematics across different contexts. Building on this, Tout (2020) explains that numeracy extends beyond computation and involves applying mathematical thinking in everyday situations, showing that numeracy is not only theoretical but also practical in nature.

In relation to academic success, Guhl (2019) emphasizes that early numeracy skills serve as a strong predictor of later academic achievement. Supporting this idea, Ofsted (2018) highlights the importance of early mathematical instruction in strengthening learners' future performance in school. However, Ofsted (2018) also points out that despite its importance, many learners continue to demonstrate low numeracy levels, suggesting that there are existing challenges in how numeracy is developed in classrooms.

To understand these challenges, Dowker (2016) explains that numeracy development is influenced by internal cognitive factors such as working memory, language ability, and prior mathematical knowledge. Extending this perspective, Setiawan *et al.* (2024) focus on external influences, identifying insufficient learning materials, limited resources, and low self-efficacy as contributing factors to weak numeracy performance. When these findings are considered together, it becomes clear that numeracy difficulties are shaped by both cognitive limitations and learning environment conditions.

With regard to improving numeracy, Pratiwi *et al.* (2024) explain that numeracy literacy is closely connected to problem-solving skills, especially when learners are exposed to contextual learning. Similarly, Hardiyana *et al.* (2025)

emphasize that instructional approaches such as problem-based learning, game-based learning, and differentiated instruction significantly enhance learners' mathematical understanding. In the same direction, Bauyon (2023) found that learners exposed to interactive and contextualized instruction demonstrated better mastery of basic mathematical operations, showing that meaningful learning experiences strengthen numeracy development and improve learners' ability to apply mathematical concepts in everyday situations.

In addition to instructional approaches, Ridwan et al. (2023) highlight the importance of self-efficacy, explaining that learners who have higher confidence in their abilities tend to perform better in numeracy tasks and demonstrate greater persistence during challenging activities. This adds a psychological dimension to numeracy development, indicating that even effective teaching strategies may be less successful if learners lack confidence in their mathematical abilities.

C. Synthesis of the Reviewed Literature and Studies

The literature consistently shows that functional literacy is developed through the integration of reading comprehension, writing, and numeracy rather than isolated skills. Foundational abilities like decoding, grammar, and computation are important but insufficient without higher-order skills such as comprehension, critical thinking, problem-solving, and real-life application.

Reading comprehension emerges as the core of functional literacy, shaped by vocabulary, fluency, and background knowledge. Writing development is influenced by both structured instruction and meaningful literacy experiences, while numeracy is strengthened through contextualized and problem-based learning, along with cognitive and motivational factors such as self-efficacy.

Overall, the studies suggest that functional literacy improves when these skills are taught in an integrated and meaningful way that connects cognitive development, effective instruction, and real-world application.

3. Research Methodology

This section presents the methodology that will be used in the study, including the respondents, the population, the research instrument, the validation process for the instrument, the data-gathering process, and the statistical treatment.

A. Method of Research

This study utilized a quantitative descriptive research design to assess the functional literacy skills of Grade 4 learners in selected public elementary schools in Cabiao, Nueva Ecija. The quantitative approach was used because the study gathered numerical data through a researcher-made questionnaire and analyzed the results using statistical tools such as frequency, percentage, and weighted mean. Meanwhile, the descriptive

design enabled the researchers to systematically describe the learners' level of functional literacy in terms of reading comprehension, writing for practical purposes, and applied numeracy skills, as well as the home-related and learning environment factors affecting literacy development.

B. Population, Sample Size, and Sampling Technique

The respondents of this study are learners from the public schools in Cabiao, Nueva Ecija, specifically from Cabiao Central School, Bagong Silang Elementary School, and Palasinan Elementary School. The total population of learners among these schools is 320.

The Cochran's formula will be used to compute the sample size to determine the appropriate number of respondents.

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where:

n_0 – initial sample size from Cochran's Formula

N - total number of population

n - corrected sample size

The Calculator

Precision Level:

Confidence Level:

Estimated Proportion:

Small Population: ☒

Population Size:

The appropriate sample size given the population size and specified combination of precision, confidence and variability is 175.

The researchers calculated the sample size for each school by dividing the population of each selected school by the total population. The resulting proportion was multiplied by 100 to obtain the percentage, which was then used to determine the number of respondents from each school based on the total sample size.

$$GA = \frac{\text{sample size}}{\text{total number of population}} \quad GA = \frac{175}{320}$$

$$GA = 0.5468 \text{ or } 54.69\%$$

The sample size and total population are presented in Table 1. The first column lists the names of the selected schools in Cabiao, Nueva Ecija. The second column shows the total number of Grade 4 students in each school, which amounts to

Table 1
Total number of population and sample size

Name of School	Total Number of Population	Sample Size
Cabiao Central School	166	91
Bagong Silang Elementary School	79	43
Palasinan Elementary School	75	41
Total	320	175

320. The third column displays the sample size for each school, totaling 175, as determined using Cochran's Formula. Specifically, 91 respondents were selected from the 166 students at Cabiao Central School, 43 respondents from the 79 students at Bagong Silang Elementary School, and 41 respondents from the 75 students at Palasinan Elementary School.

The study will use systematic sampling to select respondents. Every 3rd student will be picked until the sample is complete. This method is fair and ensures a good mix of learners from all sections.

C. Description of Respondents

The respondents of this study are Grade 4 learners, aged 9 to 11, from Cabiao Central School, Bagong Silang Elementary School, and Palasinan Elementary School in Cabiao, Nueva Ecija. Both boys and girls with different levels of prior knowledge, access to home learning resources, and familiarity with technology were included. Their diverse backgrounds make them a representative group for assessing functional literacy skills in reading, writing, and numeracy, which will help guide the development of a focused Literacy Enhancement Program.

D. Research Instrument

The main tool used in this study is a researcher-made functional literacy assessment questionnaire, developed to measure the functional literacy skills of Grade 4 learners. Its design was guided by the Functional Literacy, Education, and Mass Media Survey (FLEMMS) framework of the Philippine Statistics Authority, which defines functional literacy as the ability to read, write, compute, and comprehend information in real-life contexts. The questionnaire is child-friendly, using simple language, short scenarios, and multiple-choice questions to ensure learners can respond confidently and accurately.

The questionnaire is divided into two parts. The first part gathers information on home-related and learning environment factors, including access to technology, availability of a study area at home, parent or guardian support in learning, time spent reading, reading frequency at home, and attitude toward reading, providing context on factors that may influence literacy development. The second part assesses the learners' functional literacy skills in reading comprehension, writing for practical purposes, and applied numeracy, evaluating their ability to understand texts, communicate ideas effectively, and solve real-life mathematical problems. Together, these sections provide a complete picture of learners' literacy abilities and serve as the foundation for developing a tailored Literacy Enhancement Program.

To ensure the validity of the instrument, it was reviewed and validated by professionals, Mr. Ville Andrei M. Vilanio, Dr. Dina Grace T. Magnaye, and Ms. Nikki P. Elicaño—who evaluated its content, clarity, relevance, and appropriateness for Grade 4 learners prior to its administration to ensure its reliability, accuracy, and suitability for the intended learners.

The researchers submitted the research instrument to the University Research Ethics Committee (UREC) for evaluation to ensure adherence to ethical standards. Following a thorough

review of the study's objectives, methodology, and data-gathering procedures, the committee confirmed that the research complies with established ethical principles and institutional policies. Ethical clearance was subsequently granted, certifying that the rights, dignity, and welfare of the participants are fully protected throughout the conduct of this study.

E. Data-Gathering Procedure

The data for this study will be collected through a carefully planned process to ensure accuracy and reliability. First, the researchers will seek permission from Mr. Marciano R. De Guzman Jr., Master Teacher I of Bagong Silang Elementary School; Dr. Rodel R. Danganan, School Principal III of Cabiao Central School; and Mrs. Arlene V. Vicencio, School Principal I of Palasinan Elementary School, and coordinate with them to schedule the administration of the assessment. The research instrument will be reviewed and validated by Mr. Ville Andrei M. Vilanio, Dr. Dina Grace T. Magnaye, and Ms. Nikki P. Elicaño, and pilot-tested to ensure it is clear, age-appropriate, and effective in measuring the learners' literacy skills. Once approved, the researchers will personally administer the questionnaire to the selected Grade 4 learners, providing clear instructions and assuring them that their responses will remain confidential and will not affect their grades. After the test, all answer sheets will be collected and scored based on a prepared scoring key. The results will then be encoded, analyzed, and interpreted to identify trends, strengths, and areas needing improvement, which will serve as the foundation for designing a Literacy Enhancement Program tailored to support the learners' growth and address their specific literacy needs effectively.

F. Statistical Treatment of Data

1) Frequency and Percentage

Frequency and percentage distribution will be used to describe the demographic profile of the respondents, such as age, sex, grade level, primary language spoken at home, school attendance, access to technology, availability of a study area, parent/guardian support, time spent reading per day, reading frequency at home, and attitude toward reading.

Formula:

$$P = f/N \times 100$$

Where:

P = percentage

f = frequency

N = total number of respondents

2) Weighted mean

The weighted mean will be used to determine the level of functional literacy of the respondents based on their scores in the Researcher-Made Functional Literacy Assessment Questionnaire. This statistical tool will help describe the overall performance of learners in applying literacy skills in real-life situations and provide a clearer basis for interpreting their functional literacy levels, identifying areas of strength, and determining aspects that may require further improvement and support.

Formula:

$$\bar{X} = \frac{\sum(f \cdot x)}{N}$$

Where:

f = the number of learners giving a particular score

x = the weight or assigned score

$\sum(f \cdot x)$ = the sum of all weighted scores

N = the total number of learners

Scoring and Interpretation:

The responses from the Functional Literacy Assessment Questionnaire will be scored based on the number of correct answers obtained by the learners. Each correct response will be given a corresponding point, while incorrect answers will be given zero points. The scores obtained from all items will then be added to determine the learner's total raw score for the assessment.

The total raw score will then be converted into a percentage score using the formula:

$$\text{Percentage Score} = (\text{Score} \div \text{Total Items}) \times 100$$

To interpret the learners' performance in a more balanced scale, the computed percentage score will then be transformed using the formula:

$$\text{Transmuted Score} = (\text{Percentage Score} \times 50\%) + 50$$

This transmutation ensures that the final scores fall within a standardized range, allowing for a more consistent interpretation of learners' functional literacy levels. It also facilitates clearer comparison of learners' overall performance across the different literacy skill areas assessed in the study.

The transmuted scores shall be interpreted using the descriptors prescribed in DepEd Order No. 8, s. 2015, as follows in table 2 and table 3.

Likert Scale:

The computed transmuted scores of the respondents shall be interpreted using a five-point Likert scale to describe their level of functional literacy.

4. Results and Discussion

This section presents the results, analysis, and interpretation of the data gathered regarding the level of functional literacy skills and the extent of home-related and learning environment factors of Grade 4 learners.

A. Levels of Functional Literacy Skills of Grade 4 Learners

Table 4 reveals that the overall level of functional literacy skills among the respondents is Very Satisfactory with a composite mean of 3.66. This indicates that, in general, the learners possess the necessary skills to read, write, and apply numerical concepts in practical situations, though there is still room for improvement in specific areas.

Among the three components, Reading Comprehension obtained the highest weighted mean of 4.13, described as Very Satisfactory. This means that most learners can understand and interpret written texts effectively, identify details, and draw appropriate meanings from what they read. This is followed closely by Writing for Practical Purposes with a mean of 3.89, also interpreted as Very Satisfactory. This shows that learners can construct clear, grammatically correct, and appropriate written messages for different purposes such as making requests, giving reminders, or explaining simple ideas.

On the other hand, Applied Numeracy Skills recorded the lowest mean of 2.95, described only as Satisfactory. This suggests that while learners can perform basic mathematical operations, they encounter difficulties when these skills need to be applied in real-life contexts, such as computing change, measuring time or distance, and solving simple word problems. This finding implies that learners are more proficient in language-based skills compared to their ability to use mathematics in daily situations.

As emphasized by the Organization for Economic Co-operation and Development [OECD] (2019) and Medzhidova

Table 2

Transmuted Score	Descriptive Rating	Interpretation
90-100	Outstanding (O)	Excellent mastery of literacy
85-89	Very Satisfactory (VS)	Strong Mastery
80-84	Satisfactory (S)	Adequate Understanding
75-79	Fairly Satisfactory (FS)	Partial understanding; needs reinforcement
Below 75	Did Not Meet Expectations (DNME)	Needs remediation or additional support

Table 3

Scale	Transmuted Scores	Verbal Interpretation
5	90–100	Very High
4	85–89	High
3	80–84	Moderate
2	75–79	Low
1	Below 75	Very Low

Table 4

Weighted mean of grade 4 Learners' levels of functional literacy skills		
Literacy Skill Area	Weighted Mean (WM)	Verbal Interpretation (VI)
Reading Comprehension	4.13	Very Satisfactory
Writing for Practical Purposes	3.89	Very Satisfactory
Applied Numeracy Skills	2.95	Satisfactory

Legend: 4.21–5.00= Outstanding; 3.41–4.20 = Very Satisfactory; 2.61–3.40 = Satisfactory; 1.81–2.60=Fair; 1.00–1.80= Needs Improvement

et al. (2021), numeracy requires higher-order thinking and the ability to connect abstract concepts to reality, a competency that remains a global challenge for learners.

The results support the functional literacy framework, showing strong reading and writing skills but a need to improve applied numeracy through real-life activities.

B. Extent of Home-related and Learning Environment Factors

Table 5
Frequency and percentage distribution of access to technology

Technology at home	Frequency (f)	Percentage (%)
Smartphone	149	85.1%
Internet	146	83.4%
Tablet	79	45.1%
Laptop/Computer	72	41.1%

Table 5 shows that Smartphones are the most accessible technology at home, with 85.1% of learners having access, followed by Internet Connection at 83.4%. In contrast, less than half of the respondents have access to tablets (45.1%) or laptops/computers (41.1%). This indicates that while most learners can connect to digital resources through mobile devices, access to more advanced or larger-screen devices remains limited. This is a significant consideration as mobile devices are often the primary means of accessing learning materials and online information. According to the study of UNESCO (2020), mobile devices such as smartphones serve as essential tools for learning in many households, especially in developing countries where access to computers and stable internet remains unequal. This aligns with the findings, indicating that while learners are digitally connected, the type of device available influences the quality and extent of learning opportunities they can access at home.

Table 6
Frequency and percentage distribution about study area at home

Study Area	Frequency (f)	Percentage (%)
At a desk or table in a quiet place	111	63.4%
On the bed or floor	27	15.4%
In a shared space (living room, etc.)	22	12.6%
Has no fixed study area	15	8.6%

Table 6 reveals that most of the learners (63.4%) have a dedicated study area at home, a desk or table in a quiet place, an environment conducive to learning. Meanwhile, 15.4% study on the bed or floor, 12.6% in shared spaces, and 8.6% do not have a fixed area at all. This suggests that most learners have physical conditions suitable for studying, although a notable number still face environmental challenges that may affect focus and learning efficiency. This aligns with the findings of Abad (2021), who established that a specific, quiet, and comfortable study space is a fundamental predictor of academic success. Similarly, United Nations Children's Fund [UNICEF] (2021) emphasized that the physical environment

directly affects concentration and efficiency, noting that learners without proper study areas are more likely to struggle in developing functional literacy skills.

Table 7 indicates that nearly half of the learners (48.6%) receive direct help with homework from their parents or guardians. Another 20.6% are given encouragement and motivation, while 14.9% get assistance in using technology or online platforms. However, 12.0% reported receiving no help at all. This shows that while parental involvement is generally high, there is still a group of learners who rely entirely on themselves when doing schoolwork, which may impact their academic performance and limit opportunities for additional guidance and reinforcement at home. According to Gultiano & Xenos (2020), parental involvement, whether through direct assistance or simple encouragement, is a crucial variable in literacy development. DepEd (2022) also reinforced this, stating that functional literacy is best developed when there is a strong partnership between school and home support systems.

Table 8
Frequency and percentage distribution about time spent reading per day

Duration	Frequency (f)	Percentage (%)
More than 1 hour a day	16	9.1%
31-60 minutes a day	21	12.0%
15-30 minutes a day	56	32.0%
Less than 15 minutes a day	57	32.6%
Does not read every day	25	14.3%

As shown in Table 8, the largest proportion of learners spend less than 15 minutes reading each day (32.6%), followed closely by those who read for 15–30 minutes (32.0%). Only a small percentage read for longer periods, with 12.0% reading for 31–60 minutes and 9.1% reading for more than an hour. Furthermore, 14.3% reported that they do not read every day. These figures suggest that while reading is practiced at home, the duration is generally short, and a considerable number of learners do not engage in daily reading activities. According to PSA (2023) and OECD (2019), there is a direct positive correlation between the amount of time spent reading and the level of reading proficiency. Medzhidova et al. (2021) further explained that functional literacy is developed through prolonged and meaningful engagement with texts; therefore, limited reading time may restrict learners' opportunities to strengthen comprehension, vocabulary, and critical-thinking skills. Regular and sustained reading practice provides learners with greater exposure to different types of texts and opportunities to apply their literacy skills in meaningful contexts. This may help explain why the learners' overall functional literacy rating is "Very Satisfactory" rather than "Outstanding," indicating a need to encourage more consistent and sustained reading practices at home and in school.

Table 9 shows that the most common reading frequency is 1–

Table 7
Frequency and percentage distribution in terms of support in learning with Parent/Guardian

Form of Support	Frequency (f)	Percentage (%)
Help with homework	85	48.6%
Encouragement and motivation	36	20.6%
Help with online learning or technology	26	14.9%
Reminders to study or do school tasks	7	4.0%
No help at home	21	12.0%

2 times a week (37.7%), while only 20.6% of learners read every day. Meanwhile, 14.9% of the learners read 3–4 times a week, 18.9% rarely read, and 8.0% never read at all. This pattern indicates that reading is not yet a consistent daily habit for most Grade 4 learners, which may affect the development of their reading fluency, vocabulary, and comprehension skills over time. The limited frequency of reading may also reduce learners' opportunities to practice understanding different types of texts and applying reading skills in various situations. DepEd (2022) identifies regular reading habits as the foundation of literacy development, emphasizing that consistent reading practice provides learners with opportunities to improve their fluency, comprehension, vocabulary, and overall literacy skills. Abad (2021) added that frequency of practice is as important as duration; irregular habits prevent the automaticity required in functional literacy, where information must be processed quickly and accurately in daily life.

Table 9
Frequency and percentage distribution on reading frequency at home

Frequency	Frequency (f)	Percentage (%)
Every day	36	20.6%
1-2 times a week	66	37.7%
3-4 times a week	26	14.9%
Rarely	33	18.9%
Never	14	8.0%

Table 10
Frequency and percentage distribution to attitude toward reading

Attitude	Frequency (f)	Percentage (%)
Very Enjoyable	76	43.05%
Enjoyable	57	32.6%
Sometimes enjoyable	28	16.0%
Not enjoyable	14	8.0%

Table 10 reveals a positive finding, with most learners finding reading very enjoyable (43.05%) or enjoyable (32.6%). This suggests that a large proportion of learners have a positive interest in reading and are willing to engage with reading activities. Meanwhile, 16.0% find reading sometimes enjoyable, while 8.0% do not enjoy it at all. These results indicate that although some learners may have limited reading habits, their generally positive attitude provides a good opportunity to encourage more frequent reading. This indicates that despite short reading durations and irregular frequency, learners generally have a favorable attitude toward reading. Medzhidova et al. (2021) emphasized that motivation and positive attitudes support literacy improvement, as learners who enjoy reading are more likely to participate actively and develop consistent reading practices. Meanwhile, UNESCO (2020) highlighted the importance of making learning enjoyable to encourage self-directed reading and learning at home, which can further strengthen learners' literacy development beyond the classroom.

C. Proposed MATH-IN-ACTION Program (Mathematics in Daily Life and Practical Application Program) for Grade 4 Learners

Table 11 presents the proposed MATH-IN-ACTION Program for Grade 4 learners, which is designed to strengthen learners' mathematics literacy through engaging, meaningful, and real-life learning experiences. The program was developed in response to the observed difficulty of learners in applying mathematical concepts in practical situations, particularly in solving contextualized word problems and performing applied numeracy tasks.

The program is composed of five key components that progressively develop learners' understanding and application

Table 11
Action plan for the proposed MATH-IN-ACTION program

Program Component	Objectives	Activities / Strategies	Persons Involved	Time Frame	Expected Outcomes	Indicator
Daily Math in Classroom Routines	Strengthen learners' mental computation and familiarity with basic mathematical concepts through daily exposure	Integrate short math activities such as attendance counting, calendar use, mental math drills, and quick problem-solving warm-ups	Grade 4 Teachers and Learners	Whole School Year	Learners develop consistency and confidence in basic mathematical operations	Improved speed and accuracy in daily math tasks
School-Based Buying and Selling Simulation	Develop learners' understanding of money concepts and basic operations in real-life contexts	Conduct classroom mini-market activities using play money where learners buy and sell simple items	Grade 4 Teachers and Learners	Term 1	Learners accurately perform basic financial transactions and computations	Improved money-related problem-solving skills
Measurement in Real-Life School Settings	Enhance learners' ability to apply measurement skills in actual environments	Measure classroom objects such as desks, books, doors, and classroom spaces using appropriate tools	Grade 4 Teachers and Learners	Term 1	Learners correctly use measurement tools and units in practical situations	Improved accuracy in measurement tasks
Word Problem Transformation and Solving Activities	Improve learners' comprehension and problem-solving skills in contextualized situations	Guide learners in converting real-life scenarios into mathematical expressions and solving one- to two-step word problems	Grade 4 Teachers and Learners	Term 2	Learners demonstrate improved understanding and solution strategies for word problems	Improved performance in word-problem solving
Home and Community-Based Math Activities	Strengthen application of mathematics in home and community contexts with family involvement	Assign practical tasks such as grocery listing, simple budgeting, counting household items, and measuring ingredients at home	Grade 4 Teachers, Learners, and Parents/ Guardians	Term 2–3	Learners recognize and apply mathematics in everyday life situations	Increased application of math in real-life contexts

of mathematics. The first component, Daily Math in Classroom Routines, integrates short and consistent mathematical activities into everyday classroom practices such as attendance checking, calendar use, and mental math exercises. This approach aims to build learners' familiarity with numbers and improve their fluency in basic operations through regular exposure.

The second component, School-Based Buying and Selling Simulation, provides learners with opportunities to experience simple financial transactions using play money. Through structured classroom activities that simulate a mini-market, learners are guided in computing prices, giving change, and applying basic operations in a realistic context.

The third component, Measurement in Real-Life School Settings, focuses on hands-on learning experiences where learners measure actual objects found in the classroom environment. By using real materials such as rulers and measuring tools, learners are expected to develop a clearer understanding of measurement concepts and their practical application.

The fourth component, Word Problem Transformation and Solving Activities, emphasizes comprehension and analytical thinking. Learners are guided in interpreting real-life situations and translating them into mathematical expressions before solving them. This process strengthens both their understanding of the problem and their ability to select appropriate solutions.

The fifth component, Home and Community-Based Math Activities, extends learning beyond the classroom by involving parents or guardians in meaningful, simple, and practical mathematics-related tasks. Activities such as grocery listing, basic budgeting, and household counting help learners recognize the relevance of mathematics in their daily lives.

Overall, the MATH-IN-ACTION Program is anchored on the principle that mathematics learning becomes more meaningful when it is connected to learners' real-world experiences. By providing structured, contextualized, and experiential learning opportunities, the program is expected to enhance learners' confidence, improve their problem-solving skills, and strengthen their ability to apply mathematics in everyday situations.

5. Summary of Findings, Conclusions, and Recommendations

This section presents the summary of findings, conclusions, and recommendations derived from the analysis and interpretation of data presented in the previous chapter. The study aimed to assess the functional literacy skills of Grade 4 learners as a basis for developing a literacy enhancement program in selected public elementary schools in Cabiao, Nueva Ecija, during the School Year 2025–2026.

A. Summary of Findings

1. The level of functional literacy skills of Grade 4 learners is as follows:
 - 1) reading comprehension obtained a weighted mean of 4.13;
 - 2) writing for practical purposes obtained a weighted

mean of 3.89; and

- 3) applied numeracy skills obtained a weighted mean of 2.95.
2. The extent of the learners' home-related and learning environment factors in terms of:
 - 1) access to technology revealed that 85.1% have access to smartphones, 83.4% have internet connection, 45.1% have tablets, and 41.1% have laptops/computers;
 - 2) availability of a study area at home revealed that 63.4% study at a desk or table in a quiet place, 15.4% study on the bed or floor, 12.6% study in shared spaces, and 8.6% have no fixed study area;
 - 3) parent or guardian support in learning revealed that 48.6% receive help with homework, 20.6% receive encouragement and motivation, 14.9% receive help with online learning or technology, 4.0% receive reminders to study, and 12.0% receive no support at home;
 - 4) time spent reading per day revealed that 32.6% read for less than 15 minutes, 32.0% read for 15–30 minutes, 12.0% read for 31–60 minutes, 9.1% read for more than one hour, and 14.3% do not read every day;
 - 5) reading frequency at home revealed that 20.6% read every day, 37.7% read 1–2 times a week, 14.9% read 3–4 times a week, 18.9% rarely read, and 8.0% never read; and
 - 6) attitude toward reading revealed that 43.05% find reading very enjoyable, 32.6% find it enjoyable, 16.0% find it sometimes enjoyable, and 8.0% find it not enjoyable.

B. Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. The respondents' level of functional literacy skills in terms of:
 - a. reading comprehension is very satisfactory;
 - b. writing for practical purposes is very satisfactory; and
 - c. applied numeracy skills is satisfactory.
2. The respondents' home-related and learning environment factors indicate that:
 - a. most learners have access to smartphones and internet connection;
 - b. majority of the learners have a dedicated study area at home;
 - c. most learners receive support from their parents or guardians in learning;
 - d. most learners spend less than 30 minutes reading per day;
 - e. majority of the learners read only 1–2 times a week; and
 - f. most learners have a positive attitude toward reading.

C. Recommendations

1. Teachers should strengthen the functional literacy skills of Grade 4 learners by providing competency-based and authentic learning experiences that develop reading, writing, and numeracy skills for everyday use. Since numeracy obtained the lowest score, teachers should integrate practical mathematical activities, such as budgeting, computing discounts and change, interpreting graphs, measuring objects, and solving real-life word problems, into daily instruction. Reading and writing skills should likewise be reinforced through guided reading and meaningful writing activities using engaging and learner-centered instructional materials.
2. Parents or guardians should provide both printed and simple offline reading materials, set up a quiet, bright, and distraction-free study corner at home, spend 20–30 minutes daily listening to their child read and answering questions about the text, monitor reading frequency using a simple log, join school orientation sessions, and use stories and discussions that match their child's interests to make reading enjoyable, thereby improving their functional literacy skills.
3. Schools may implement the MATH-IN-ACTION PROGRAM (Mathematics in Daily Life and Practical Application Program). Since learners often view mathematics as abstract and difficult, this program makes lessons relevant and useful by strengthening applied numeracy skills through practical tasks such as handling money, measuring objects, reading simple data, and solving everyday problems.

References

- [1] G. Abad, "Home learning environment and student performance," Master's thesis, Academic Repository, 2021.
- [2] Ö. Altındağ Kumaş, "The effects of environmental writing intervention on early literacy skills of pre-school children at risk," *Anatolian J. Educ.*, vol. 6, no. 1, pp. 91–102, 2021.
- [3] N. Amanzhol, A. Amanova, B. Kerimbekova et al., "'My expectation did not meet reality': Challenges of students in English-medium instruction in Kazakhstan," *Asian Educ. Dev. Stud.*, vol. 13, no. 1, pp. 31–44, 2024.
- [4] N. Bagolong and A. Usop, "Youth Filipinos' low reading comprehension," research report, 2021.
- [5] C. C. Bautista, "Functional literacy level of intermediate grade learners," *Int. Res. Educ. J.*, vol. 12, no. 2, 2024.
- [6] M. C. O. Bauyon, "Project MBO (Mastery of Basic Operations) in improving the numeracy level of K–3 elementary learners," *JPAIR Multidiscip. Res. J.*, vol. 54, no. 4, 2023.
- [7] Binhi English Literacy Foundation, "Tackling learning poverty and functional illiteracy in the Philippines: The critical role of early literacy and Binhi's impact," Binhi English Literacy Foundation, Manila, Philippines, Rep., 2024.
- [8] H. Bordey, "PSA: Over 18M Filipino high school graduates can't comprehend what they read," *GMA News Online*, Apr. 30, 2025.
- [9] K. Cain and J. Oakhill, "Children's comprehension difficulties: A developmental and component skills analysis," *Sci. Stud. Read.*, vol. 19, no. 1, pp. 43–58, 2015.
- [10] A. K. Campo, N. R. Delos Reyes, J. J. Tenerife-Cañete et al., "Unraveling the complexities of reading comprehension among learners with special educational needs in Philippine inclusive settings," *J. Learn. Dev. Stud.*, vol. 5, no. 2, Art. no. 3, 2025.
- [11] J. Cole and J. Feng, "Writing skills of elementary pupils in research," *Scimatic J.*, vol. 3, no. 1, pp. 12–25, 2015.
- [12] M. Connolly, "Real-life applications of reading comprehension in primary education," *LearningMole*, 2025.
- [13] B. D. DeBaryshe, "Supporting emergent writing in preschool classrooms: Results of a professional development program," *Educ. Sci.*, vol. 13, no. 9, Art. no. 961, Sep. 2023.
- [14] R. O. De Lemios, "From Tagalog to English: Pupils' writing proficiency levels after three years in Mother Tongue-Based Multilingual Education," *J. Community Dev. Res.*, vol. 16, no. 3, pp. 115–133, 2023.
- [15] M. Del Mundo et al., "Determinants of spatial heterogeneity of functional illiteracy among school-aged children in the Philippines: An ecological study," *Int. J. Environ. Res. Public Health*, vol. 16, no. 1, Art. no. 137, 2024.
- [16] Department of Education (DepEd), "DepEd strengthens commitment to literacy as FLEMMS results show gains," Department of Education, Pasig City, Philippines, Press Release, 2024.
- [17] Department of Education (DepEd), "Functional literacy," Department of Education, Pasig City, Philippines, Policy Brief Series 25-002, 2025.
- [18] Department of Education (DepEd), "Functional literacy assessment framework," DepEd Central Office, Pasig City, Philippines, Rep., 2022.
- [19] DepEd Bataan Publications, "Reading between the lines: The crisis of functional literacy among Filipino students," *DepEd Bataan Publications*, Balanga, Philippines, 2025.
- [20] A. Dowker, *Individual Differences in Arithmetic: Implications for Psychology, Neuroscience and Education*. London, U.K.: Psychology Press, 2016.
- [21] FEU Public Policy Center, "Developing functional literacy and 21st-century skills," Far Eastern University, Manila, Philippines, Res. Rep., 2021.
- [22] N. Fitrianingrum and I. K. Aryani, "Critical analysis of writing skills through the School Literacy Movement in Grade IV students," in *Proc. 1st Int. Conf. Soc. Sci. (ICSS)*, vol. 3, no. 1, 2024, p. 197.
- [23] B. R. Foorman, S. Herrera, Y. Petscher et al., "The simple view of reading: Evidence from a longitudinal study of elementary-aged children," *J. Learn. Disabil.*, vol. 48, no. 6, pp. 605–619, 2015.
- [24] P. Guhl, "The impact of early math and numeracy skills on academic achievement in elementary school," Master's thesis, Dominican Univ. of California, San Rafael, CA, USA, 2019.
- [25] S. Gultiano and P. Xenos, "Factors affecting literacy levels in the Philippines," Philippine Population Institute, Quezon City, Philippines, Demographic Res. Rep. 14, 2020.
- [26] M. R. Hardiyana, S. S. Dewanti, A. Abroto, and S. Suwardi, "Teachers' strategies in enhancing numeracy skills in elementary schools," *Int. J. Basic Educ. Res.*, vol. 6, no. 1, pp. 45–58, 2025.
- [27] J. M. Imperial and E. Ong, "Application of lexical features towards improvement of Filipino readability identification of children's literature," arXiv:2104.09033, 2021.
- [28] C. A. D. Into, "Post-pandemic assessment of fundamental reading, writing, and arithmetic skills of Grade 5 learners," *Digit. J. Philipp.*, vol. 2, no. 1, pp. 119–131, 2024.
- [29] N. Kurmaniak, "The development of numeracy skills in children," *Study.com*, 2021.
- [30] J. R. Larioque, "Low reading literacy skills of elementary pupils in the Philippines: A systematic review," *Int. J. Res. Appl. Sci. Eng. Technol.*, vol. 7, no. 5, pp. 102–109, 2019.
- [31] R. I. G. Lucas et al., "Addressing the poor reading performance of Filipino learners: Beyond curricular and instructional interventions," *De La Salle Univ. Policy Brief*, Manila, Philippines, 2021.
- [32] M. G. Medzhidova, A. A. Adieva, M. A. Medzhidov et al., "Formation of functional literacy as a basis for improving the quality of the educational process," *Eur. J. Nat. Hist.*, no. 5, pp. 15–20, 2021.
- [33] Organisation for Economic Co-operation and Development (OECD), *PISA 2018 Results (Volume I): What Students Know and Can Do*. Paris, France: OECD Publishing, 2019.
- [34] Ofsted, "An investigation into how to raise standards in numeracy in schools," Office for Standards in Education, London, U.K., Res. Rep., 2018.
- [35] Organisation for Economic Co-operation and Development (OECD), *PISA 2018 Assessment and Analytical Framework: Reading, Mathematics and Scientific Literacy*. Paris, France: OECD Publishing, 2019.
- [36] Philippine Statistics Authority, "For every 10 Filipinos, 9 have basic literacy while 7 have functional literacy: 2024 FLEMMS final results," PSA, Quezon City, Philippines, Special Release, 2025.

- [37] C. P. Pratiwi, W. Murtafiah, and R. Rakhmad, "The relationship between reading literacy and numeracy in solving story problems: Elementary school students," *J. Eduscience*, vol. 12, no. 5, pp. 1248–1258, 2024.
- [38] T. Rasinski and N. Padak, "Effective reading instruction: The development of comprehension and fluency," *Read. Teach.*, vol. 69, no. 4, pp. 401–410, 2016.
- [39] M. Ribeiro, B. Malcorra, D. Pintor, and N. B. Mota, "'Once upon a time...': Literary narrative connectedness progresses with grade level," arXiv:2501.04561, 2025.
- [40] M. Ridwan, M. Misbahudholam AR, F. Budiyo, and T. Sukitman, "Improve the numeracy skills of fifth-grade students through self-efficacy in elementary schools," *J. Ilm. Sek. Dasar*, vol. 7, no. 3, pp. 526–535, 2023.
- [41] R. T. Romano and I. H. Casupanan, "Writing intervention strategies and the writing skills of Grade 4 learners in Mabayan Elementary School District 2-B, Olongapo City," *Int. J. Recent Adv. Multidiscip. Top.*, vol. 5, no. 2, pp. 23–29, 2024.
- [42] B. Setiawan, I. N. Muharani, M. Z. Arifin, and D. Ardianto, "Problematic numerical literacy in elementary schools: Systematic literature review," *INVENTA: J. Pendidik. Guru Sek. Dasar*, vol. 8, no. 1, pp. 11–24, 2024.
- [43] R. Sicut and J. David, "Marginalized learners and literacy challenges in the Philippines," *Philipp. Educ. Q.*, vol. 18, no. 2, pp. 45–60, 2016.
- [44] M. Spencer and R. K. Wagner, "The comprehension problems of children with poor reading comprehension despite adequate decoding: A meta-analysis," *Rev. Educ. Res.*, vol. 88, no. 3, pp. 366–400, Jun. 2018.
- [45] M. Su, Y. Fan, J. Wu, B. Qiao, and W. Zhou, "The influence of the literacy environment on children's writing development in Chinese," *Front. Psychol.*, vol. 13, Art. no. 963283, 2022.
- [46] E. F. Tomas *et al.*, "Low reading literacy skills of elementary pupils in the Philippines," *Int. J. Res. Appl. Sci. Eng. Technol.*, vol. 9, no. 6, pp. 154–160, 2021.
- [47] M. J. L. Tomas, E. T. Villaros, and S. M. A. Galman, "The perceived challenges in reading of learners: Basis for school reading programs," *Open J. Soc. Sci.*, vol. 9, no. 5, pp. 107–122, May 2021.
- [48] D. Tout, "Critical connections between numeracy and mathematics," Department of Education and Training, Melbourne, VIC, Australia, Discussion Paper, 2020.
- [49] H. Ulu, "Investigation of fourth-grade primary school students' creative writing and story elements in narrative text writing skills," *Int. J. Progress. Educ.*, vol. 15, no. 5, pp. 273–287, 2019.
- [50] UNESCO, Digital Inclusion in Education: Opportunities and Challenges. Paris, France: UNESCO Digital Library, 2020.
- [51] UNESCO Institute for Statistics, "Functional literacy," *UIS Data Browser Glossary*, Montreal, QC, Canada.
- [52] UNICEF, *Learning at Home: Global Perspectives on the Home Learning Environment*, Innocenti Research Report, Florence, Italy: UNICEF Office of Research, 2021.
- [53] D. J. Urpura, C. D. O'Rear, A. Ellis *et al.*, "Unique and combined effects of quantitative mathematical language and numeracy instruction within a picture book intervention," *J. Educ. Psychol.*, vol. 116, no. 1, pp. 1–19, Jan. 2024.
- [54] Victorian Curriculum and Assessment Authority, "Numeracy," VCAA, Melbourne, VIC, Australia.