



Assessment of a MATATAG Curriculum-Based Grade 1 Numeracy Workbook: Development, Validity, and Effectiveness

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ABSTRACT

Purpose of the study: This study aimed to develop a Grade 1 numeracy workbook aligned with the MATATAG Curriculum by identifying teacher-perceived difficult competencies and using them as the basis for structured, developmentally appropriate workbook activities.

Methodology: The study employed a developmental research design, purposive sampling, two checklist-rating scale questionnaires, expert validation, teacher evaluation, and descriptive statistical analysis using mean and standard deviation. Respondents were 57 Grade 1 mathematics teachers from public and private schools in Digos City, Davao del Sur.

Main Findings: Findings showed that selected first- and second-quarter competencies on addition, place value, decomposition, and number recognition were difficult for Grade 1 learners. The workbook integrated readiness tests, storytelling, Concrete-Representational-Abstract (CRA) progression, leveled activities, reflection, and lesson summaries. Expert validation and teacher evaluation demonstrated outstanding quality, achieving an overall mean score of 4.85 ($SD = 0.12$), described as Very High validity across face, content, usability, and pedagogical soundness.

Novelty/Originality of this study: The study offers a MATATAG Curriculum-based workbook directly derived from teacher-identified numeracy difficulties. Its integration of storytelling, tiered activities, emotional reflection, and concise lesson summaries provides a contextualized supplemental tool for early numeracy.

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1. INTRODUCTION

Early numeracy is an essential skill that provides the foundation for later mathematical concepts. The Philippine MATATAG Curriculum emphasizes that learners need a strong foundation in numeracy, particularly during the early years of schooling [1]. However, many learners, especially those in Grade 1, continue to struggle with basic arithmetic operations [2]. In South Africa, qualitative evidence from foundation-phase contexts shows that children from poor communities often lack sufficient numeracy instruction, learning equipment, and opportunities for active participation, which can lead to weak number understanding and low numerical performance [3]. Similarly, results from the International Common Assessment of Numeracy (ICAN) in Kenya showed that only a few learners in Grades 2 to 3 reached the expected standard in basic arithmetic operations, number recognition, and simple problem-solving [4].

In the Philippines, the same concern remains evident. The 2018 Program for International Student Assessment (PISA) report showed that more than 50% of Filipino students scored at low levels in mathematics [5]. A 2023 study further indicated that many young learners in Region IV-A (CALABARZON) may remain

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below the set level of basic mathematics proficiency until 2028 if no strong intervention is implemented [6]. In Quezon Province, elementary learners were also found to struggle with simple arithmetic; however, the implementation of Project Batang Mind, Batang Organized (BIBO) increased the numeracy rate from 85.5% to 94.5% in one year [7]. These findings show that targeted programs and instructional interventions can help address early numeracy difficulties.

Geographic inequality also affects early numeracy education. Learners in rural areas commonly experience limited access to schools, qualified teachers, and adequate learning materials [8]. These conditions contribute to persistent achievement gaps in foundational subjects such as numeracy. The United Nations states that "the priority is starting early and staying the course over two decades of childhood," emphasizing the importance of early and sustained educational support [9]. In relation to Sustainable Development Goal 4, disparities in early education remain a barrier to inclusive and equitable quality learning for all learners [10].

Learning materials such as textbooks and workbooks are important classroom resources, particularly in public schools with limited supplementary materials. The Basic Education Report 2023 identified shortages of textbooks and workbooks as a common problem in public schools, especially in rural and disaster-affected areas [11]. These shortages make it more difficult for learners to practice and master basic arithmetic, particularly during the transition to the MATATAG Curriculum. The World Bank Philippines Education Note further associates weak National Achievement Test performance at the elementary level with the need for stronger lower-grade teaching capacity in basic numeracy [12]. The Philippine Institute for Development Studies also reported that learners from low-income families are greatly affected by shortages of learning materials, fewer schools, and limited supplementary learning resources at home [10]. Therefore, developing learning materials such as workbooks is a practical response to these persistent concerns.

The theoretical foundation of the workbook is anchored in Bruner's Theory of Representations, which explains that conceptual learning begins with active participation in concrete tasks, develops through perceptual images, and culminates in abstract symbolic representation [13]. In mathematics, this sequence is operationalized through the Concrete-Representational-Abstract (CRA) approach, which begins with manipulatives, proceeds to pictorial or diagrammatic models, and ends with symbolic computation [14]. Based on this foundation, the workbook was designed to follow CRA progression in each lesson by beginning with manipulative tasks, moving to pictorial activities, and concluding with symbolic problem-solving.

Early education continues to face challenges in the teaching of basic numeracy skills, particularly in less privileged communities. These gaps hinder the development of foundational mathematics skills among young learners and affect their academic progress. The Philippine Development Plan and the Davao Development Plan share the goal of addressing urgent educational problems among young learners, yet classroom conditions such as limited learning resources, insufficient teacher guidance, and curriculum implementation changes continue to intensify learning difficulties [15], [16]. Research also shows that instructional materials can strengthen mathematics instruction, improve student learning, and support teacher effectiveness, particularly when materials are well-designed and curriculum-aligned [17].

The proposed Grade 1 numeracy workbook can benefit several stakeholders. Learners may use it to practice basic numeracy skills and strengthen their mathematical foundation. Teachers may gain a structured and aligned tool that supports lesson delivery, reinforces essential concepts, and provides ready-to-use classroom activities. School administrators may use it as a practical resource for school improvement goals related to learner performance. Parents and guardians may also use the workbook at home because it contains clear directions and self-learning activities. Educational planners may use the findings as a guide for curriculum improvement and teacher-training initiatives in early numeracy education.

This study aimed to develop a mathematics workbook for Grade 1 pupils aligned with the MATATAG Curriculum competencies. Specifically, it sought to: (1) identify the difficult competencies in numeracy as evaluated by Grade 1 teachers; (2) develop a numeracy workbook based on the identified competencies; and (3) determine Grade 1 teachers' level of acceptability of the crafted workbook.

2. RESEARCH METHOD

This study involved 57 Grade 1 mathematics teachers from public and private schools in Digos City, Davao del Sur. The participants were selected through purposive sampling to ensure that they could provide direct and relevant experience for data gathering. Purposive sampling involves selecting participants who can provide reliable and relevant information for practical research purposes [18]. Each participant met two criteria: (1) at least five years of experience in teaching mathematics, and (2) at least three consecutive years of teaching and handling Grade 1 mathematics learners. The participants evaluated the adopted questionnaire that assessed the level of difficulty and acceptability of the learning competencies used in the numeracy workbook. Their feedback guided the researchers in determining whether the workbook achieved its educational goals and whether it could be applied in classroom settings.

This study used two sets of questionnaires administered during different phases of the research process. In Phase 1, a checklist and rating scale were used to determine the most difficult competencies in teaching numeracy. The competencies were directly based on the MATATAG Curriculum Guide. Checklist and rating scale questionnaires are commonly used in quantitative research because they allow researchers to quantify respondents' characteristics and perceptions while ensuring that relevant parameters are measured [19], [20]. The instrument used a 5-point scale: (5) Very Difficult, (4) Difficult, (3) Fair, (2) Easy, and (1) Very Easy. Competencies with an average mean score between 3.40 and 5.00 were perceived as Difficult to Very Difficult and served as the basis for selecting the competencies included in the workbook. Table 1 presents the interpretation for difficulty ratings, adapted from the Likert scale interpretation framework of Pimentel [21].

Table 1. Interpretation of the Level of Difficulty of Learning Competencies in Numeracy

Likert Scale	Range	Descriptive Level	Interpretation
5	4.20-5.00	Very Difficult	The competency is very challenging for learners and requires additional support, indicating that its difficulty level is very appropriate for inclusion in the Grade 1 workbook.
4	3.40-4.19	Difficult	The competency is challenging for learners and requires additional support, indicating that its difficulty level is appropriate for inclusion in the Grade 1 workbook.
3	2.60-3.39	Fair	The competency is challenging for learners and requires additional support, suggesting it is suitable for inclusion in the Grade 1 workbook.
2	1.80-2.59	Easy	The competency is not very challenging for learners, suggesting it may not be suitable for inclusion in the Grade 1 workbook.
1	1.00-1.79	Very Easy	The competency is not challenging for learners, suggesting it is unsuitable for inclusion in the Grade 1 workbook.

After the survey identified the most challenging competencies in Phase 1, the researchers developed a Grade 1 numeracy workbook based on the results. The workbook contained six essential components: topics, specific objectives, key concepts, directions, activities, and reflection. These components are presented in Table 2.

Table 2. Components of the MATATAG Curriculum-Based Workbook in Numeracy Grade 1

Components	Description
Topics	These are logically arranged based on the sequence of the MATATAG Curriculum.
Specific Objectives	These are specified objectives based on the MATATAG Curriculum.
Key Concepts	These brief descriptions of the concept areas help students and workbook users recall important points in the topics.
Directions	These are designed to guide students and workbook users through the learning activities.
Activities	These provide learning opportunities for students and workbook users to develop mathematical skills and higher-order thinking skills.
Reflection	These questions are provided after every set of rotations to encourage students and workbook users to conduct an in-depth analysis of their learning experience with the workbook.

These components served as the framework for ensuring alignment with the MATATAG Curriculum. Topics and specific objectives ensured logical sequencing and alignment with curriculum standards [22], while key concepts supported understanding and retention of knowledge [14]. Directions provided clear guidance to promote learner independence [23], and activities supported fundamental thinking skills. Reflection helped learners assess their feelings and learning experiences [24]. For face validity, the evaluation focused on language used, format and layout, and level of difficulty.

Table 3. Interpretation for the Level of Acceptability of Learning Competencies in Numeracy

Likert Scale	Range	Descriptive Level	Interpretation
5	4.20-5.00	Very High	The content is highly relevant and aligned with the curriculum, indicating that the Grade 1 workbook is well received and effective.
4	3.40-4.19	High	The content is relevant and aligned with the curriculum, indicating that the Grade 1 workbook is received and effective.
3	2.60-3.39	Moderate	The content is relevant and aligned with the curriculum, indicating that the Grade 1 workbook is moderately received and effective.
2	1.80-2.59	Low	The content is aligned with the curriculum, yet it is perceived as poorly received and ineffective.
1	1.00-1.79	Very Low	The content is highly irrelevant to the curriculum, and the Grade 1 workbook is poorly received and deemed ineffective.

In Phase 2, a rating scale questionnaire evaluated the level of acceptability of the selected competencies for the Grade 1 numeracy workbook. This questionnaire determined whether the workbook content aligned with the goals and standards of the MATATAG Curriculum. The checklist used a 5-point Likert scale: (5) Strongly Agree, (4) Agree, (3) Uncertain, (2) Disagree, and (1) Strongly Disagree. The interpretation framework shown in Table 3, adapted from Pimentel [21], guided the validation process and ensured that the competencies met the standards of quality and curriculum relevance.

The study employed a developmental research design, which is used to create, improve, and test educational learning materials through multiple cycles of feedback and adjustment [25]. Unlike traditional research that studies pre-existing conditions, developmental research involves engagement and continuous feedback to support the success of educational materials [26]. This design enabled the researchers to adapt and revise the workbook according to learner needs and classroom conditions.

The study was conducted in three phases. In Phase 1, all necessary permissions were obtained from the Department of Education (DepEd) and other relevant offices. The researchers developed a perceived difficulty assessment, which was validated by experts to evaluate the difficulty level of the competencies and their relevance to the research objectives. The validated instrument was administered to Grade 1 teachers to identify competencies that were complex for their learners. The collected data were analyzed to determine which competencies required attention and should be addressed in the developed workbook.

Phase 2 focused on developing the proposed workbook based on the identified complex competencies. The workbook was aligned with the MATATAG Curriculum and designed to enhance learners' knowledge and skills in basic numeracy. To ensure accurate and guided workbook activities and content, the researchers referred to the Massachusetts Mathematics Textbook by Foresman and Wesley [27]. Although the book was originally intended for Grade 3 students, the researchers used it as a reference in creating and designing activities suited to the needs of Grade 1 learners.

In the final phase, a different group of Grade 1 teachers evaluated the workbook's acceptability using a structured evaluation form with a rating scale. The evaluation covered comprehensibility, curriculum alignment, and effectiveness in addressing the identified challenges and competencies. Descriptive statistics, specifically the mean, were used to determine whether the workbook met the necessary standards of validity, practicality, and classroom effectiveness. Revisions were made based on the feedback of Grade 1 teachers to strengthen the workbook's usability in actual classroom settings.

The study followed the ethical standards of the UM Digos College Research and Innovation Center. Participants were provided with a consent form and were allowed to participate voluntarily, ask questions, or withdraw without penalty. They were informed about the purpose, methodology, and their role in the study before participation. Confidentiality was maintained by protecting participant data from unauthorized access. The study was designed to benefit Grade 1 learners and teachers by addressing difficulties in learning numeracy. The researchers cited all sources properly and subjected the paper to plagiarism and AI checks. No conflict of interest, deception, or misinformation was involved. Formal permissions were obtained from school authorities before the research was conducted. The researchers and their adviser contributed to the study, with the researchers handling data collection, analysis, and interpretation and the adviser providing guidance and manuscript review.

3. RESULTS AND DISCUSSION

3.1. Identification of Difficult Competencies in Numeracy

The researchers identified the most difficult numeracy competencies based on the evaluations of Grade 1 teachers from 11 public elementary schools in Digos City, Davao del Sur. Data gathering showed that only one first-quarter competency reached a rating within the 3.40-5.00 range, corresponding to the descriptive level Difficult to Very Difficult. In the second quarter, only two competencies were included within the Difficult range. Based on the results and the adviser's guidance, the researchers selected the top five competencies from the first quarter and the top five competencies from the second quarter. Although not all of the selected competencies that fell under the Difficulty descriptive level, the top five highest-rated competencies in each of the quarter that were considered because they represented the areas that teachers perceived as relatively more challenging and therefore required greater instructional attention.

For the first quarter, the selected competencies were competencies 10, 7, 9, 8, and 2. These competencies focused mainly on basic numeracy operations, including simple addition, number recognition, and number properties. Competency 10, solving problems involving addition with sums up to 20, received the highest difficulty rating ($\bar{x} = 3.40$, $SD = 1.00$). This competency emphasizes the application of addition in word or pictorial problems that require both comprehension and computation. Its relatively high rating may be attributed to the demands of the problem-solving that requires learners to understand a given situation, identifying relevant information, determine the appropriate operation, and apply addition to obtain a solution. Thus, the competency involves both comprehension and computation rather than simple recall of the numbers facts. Competency 7 ($\bar{x} = 3.35$, $SD = 0.92$) focused on composing and decomposing numbers up to 10 using concrete materials, helping learners understand number relationships and part-whole concepts. Competency 9 ($\bar{x} = 3.12$, $SD = 0.96$) involved applying the identity and commutative properties of addition. Competency 8 ($\bar{x} = 2.98$, $SD = 1.01$) focused on illustrating addition using concrete and pictorial models, while Competency 2 ($\bar{x} = 2.96$, $SD = 1.02$) focused on reading and writing numerals up to 100. Most of these competencies were rated Fair.

For the second quarter, the competencies reflected a higher level of topic complexity. Competencies 5 and 7, which involved adding numbers using expanded form and solving addition problems up to 100 without regrouping, both received a rating of $\bar{x} = 3.53$. These were classified as Difficult. The higher difficulty ratings of these competencies may be associated with the increasing cognitive demands of the working two-digit numbers. Learners need to understand that place value, distinguish tens from ones, represents numbers in expanded form, and apply these concepts when performing addition. In addition, solving addition problems up to 100 requires the learners to interpret the problem situation and select an appropriate strategy while also working with the larger numbers. Other included competencies were Competency 4, decomposing two-digit numbers into tens and ones; Competency 3, identifying place value and digit values in two-digit numbers; and Competency 2, counting by 2s, 5s, and 10s up to 100. These competencies became the basis for the content of the proposed workbook. Table 4 presents the complete difficulty results. The results suggest that competencies requiring the learners to apply the concepts, connect the different representations and solve mathematical situations were perceived as more challenging than the competencies that involves basic recognition or comparison.

Table 4. Difficulty Level of Competencies of the MATATAG Curriculum for Grade 1 Mathematics

Competencies	$\bar{x}$	SD
First Quarter Competencies		
1. Count up to 100 (includes counting up or down from a given number and identifying a number that is one more or one less than a given number).	2.86	1.06
2. Read and write numerals up to 100.	2.96	1.02
3. Recognize and represent numbers up to 100 using a variety of concrete and pictorial models (e.g., number line, block or bar models, and numerals).	2.88	1.02
4. Compare two numbers up to 20.	2.56	0.89
5. Order numbers up to 20 from smallest to largest, and vice versa.	2.91	0.85
6. Describe the position of objects using ordinal numbers: 1st, 2nd, 3rd, up to 10th.	2.74	1.03
7. Compose and decompose numbers up to 10 using concrete materials (e.g., 5 is 5 and 0; 4 and 1; 3 and 2; 2 and 3; 1 and 4; 0 and 5).	3.35	0.92
8. Illustrate addition of numbers with sums up to 20 using a variety of concrete and pictorial models, and describe addition as "counting up" and "putting together."	2.98	1.01
9. Illustrate by applying the following properties of addition, using sums up to 20: a) The sum of zero and any number is equal to the number, and b) Changing the order of the addends does not change the sum.	3.12	0.96
10. Solve problems (given orally or in pictures) involving addition with sums up to 20.	3.40	1.00

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Second Quarter Competencies

1. Order numbers up to 100 from smallest to largest, and vice versa.	3.14	0.91
2. Counts by 2s, 5s and 10s up to 100.	3.21	0.86
3. Determine: a) the place value of a digit in a 2-digit number, b) the value of a digit, and c) the digit of a number, given its place value.	3.23	0.91
4. Decompose any 2-digit number into tens and ones.	3.35	0.83
5. Add numbers by expressing addends as tens and ones (expanded form).	3.53	1.02
6. Add numbers with sums up to 100 without regrouping, using a variety of concrete and pictorial models for: a) 2-digit and 1-digit numbers, and b) 2-digit and 2-digit numbers.	3.19	1.03
7. Solve problems (given orally or in pictures) involving addition with sums up to 100 without regrouping.	3.53	0.89

3.2. Development of a Workbook on Numeracy

After identifying the most difficult competencies for Grade 1 learners, the researchers developed a workbook to address challenges in learning basic numeracy and to support student learning. The selected competencies focused on skills such as addition, place value, and number fixing, where learners commonly experience difficulty. The researchers ensured a comprehensive scope of content by carefully selecting 10 competencies: five from the first quarter and five from the second quarter. These were chosen based on data analysis and consultation with the research adviser to ensure that the selected competencies reflected difficult aspects of numeracy and represented a balanced set of foundational skills appropriate for Grade 1 learners. The results of the difficulty-level assessment also guides the instructional design of the workbook. Since several of the identified competencies involves the problem-solving, place value, composing and decomposing numbers, and addition using the different representations, the workbook was designed to provide a sufficient scaffolding for these areas. The activities are arranged progressively, beginning with the foundational and concrete tasks and moving toward into more complex applications. Concrete and pictorial representations were incorporated to help the learners' visualize a mathematical concepts before progressing to a more abstract forms. Contextualized problem-solving were also added to allow learners to apply mathematical ideas to the familiar situations. Hence, the difficulty assessment served not only as the basis for selecting the competencies but also as the basis for determining how of these competencies can be taught within the workbook.

The workbook incorporated a sequential learning structure beginning with the Readiness Test, a diagnostic activity that helps learners assess prior knowledge and identify areas needing attention. This activity helps teachers and learners focus on essential concepts in numeracy. Diagnostic assessment in mathematics can improve learner performance because instruction becomes more focused and responsive to learner needs [28]. Thus, beginning with the Readiness Test helps ensure that learners have the foundational skills needed for subsequent lessons.



Figure 1. Sample Pretest and Lesson Layout

Each lesson begins with a storytelling approach using relatable and universal characters that present everyday situations, making abstract ideas easier for learners to understand. This approach makes learning more

enjoyable while strengthening comprehension, retention, and critical thinking in mathematics. The workbook was designed using a constructivist and learner-centered approach that encourages active participation. Instructional theories and spiral progression were integrated to ensure that numeracy concepts are revisited and mastered over time. Storytelling has been shown to improve mathematical knowledge, engagement, and achievement, supporting its integration into mathematics learning materials [29]. The spiral curriculum in mathematics also becomes more effective when topics are transparent and connected to learners' prior knowledge, beginning with general concepts and moving toward formal ideas [30].

To address the diverse needs of Grade 1 learners, the workbook incorporated tiered or leveled activities. Level 1 contained simple tasks that build foundational skills. Level 2 provided moderate challenges for independent practice. Level 3 presented more complex tasks to strengthen critical thinking and problem-solving skills. This structure was particularly relevant to the findings in the Table 4 because the identified competencies were varied in their perceived difficulty. The leveled activities allows the learners to establish a basic understanding before progressing to more demanding tasks, therefore providing gradual support for competencies that requires to higher levels of application and reasoning. This tiered approach supports differentiated instruction by allowing learners to work at an appropriate level while deepening their learning. Tiered activities provide inclusive learning pathways that challenge learners according to their individual needs [31]. Differentiated instruction in mathematics has also been shown to improve problem-solving skills, learner confidence, and the ability to work at one's own pace [32].



Figure 2. Sample Leveled Activity Layout

At the end of each topic, learners complete a reflective task called the Little Explorers Journal. In this activity, learners reflect on their feelings about the task or lesson by coloring an emoticon face. They color a smiley face when they enjoyed the lesson, a neutral face when they feel unsure, and a sad face when they experienced difficulty understanding the lesson. Through this activity, learners express the affective dimension of learning while developing self-awareness and emotional honesty. Emotional and motivational factors influence numeracy learning because engaged and confident learners are more likely to persist in mathematical problem-solving [33]. Visual and emotive tools in workbooks can also help learners manage their feelings about learning [34].

Each lesson also ends with a Little Treasure section, which provides a concise summary of the topic. This summary serves as reinforcement material that learners can revisit to refresh their understanding through brief recaps or final lesson tips. Retrieval-based and summarization activities can help improve long-term retention and conceptual transfer in mathematics [35]. By integrating reflection and summarization, the workbook supports both cognitive learning and the development of self-awareness and confidence needed for growth in numeracy.



Figure 3. Sample Journal and Wrap-up Summary Layout

The development of the workbook also demonstrates the potential of teacher-generated evidence to inform the localized educational interventions. The difficulty ratings were provided by Grade 1 teachers served as the empirical basis for the identifying specific numeracy competencies that required additional support, which may serve as the model for DepEd and local education authorities in developing the supplementary materials that respond to the competency-specific needs.

Beyond the initial validation conducted in this study, continued evaluation of the workbook after the classroom used is needed for determining the effectiveness and the identifying areas for further improvement. The learners' performance and the teachers feedback may provide evidence of how well the material supports learning, consistent with the principle of assessment for learning, where assessment information informs the improvements in teaching and learning process.

The workbook also contributes to the Sustainable Development Goal 4 by supporting the quality and the equitable primary education by focusing with structured, age-appropriate, and contextualized activities that strengthened the foundational numeracy skills. As a supplementary learning resource, it provides additional instructional that supports the Grade 1 learners and to contributes to improves the opportunities for more meaningful and effective learning in the early years of primary education.

3.3. Acceptability of the Workbook on Numeracy

Grade 1 teachers evaluated the content validity of the workbook in relation to the MATATAG Curriculum. Table 5 presents the results of the teachers' evaluation of the workbook's content validity. The workbook topics received an average of 4.03 (SD = 0.06), described as High. This indicates that the evaluators found the topics aligned with the MATATAG Curriculum, logically and carefully arranged, and well-constructed. However, items 2 and 4 obtained slightly lower mean scores of 3.96 (SD = 0.86) and 3.98 (SD = 0.85), respectively. Although these ratings were still High, the evaluators suggested that the sequence of the lessons should follow the curriculum flow. To address this recommendation, the researchers rearranged the topic sequence to strengthen alignment with the MATATAG Curriculum.

The specific objectives obtained an average of 4.14 (SD = 0.03), also described as High. This suggests that the objectives were clearly stated, measurable, attainable within the specified time, and result-oriented. The evaluators' feedback indicates that the workbook effectively addresses the Grade 1 learning competencies. This result aligns with the idea that worktexts should meet learners' levels and needs [36] and that lesson content should provide learners with opportunities to achieve the lesson objectives [37]. Learning outcomes should also be clearly stated before a new topic so learners understand what they are expected to achieve [38]. However, the indicators on the alignment with the target learning competencies, clarity and under stability, and the measurability received the lowest mean of 4.12. Although these ratings were still High, they indicated the areas where the objectives could be further refined and enhance to ensure clearer and more direct alignment with the intended competencies. The objectives was reviewed and refined to make the expected learning outcomes clearer, measurable, and consistent with the alignment on the competencies in Grade 1.

For key concepts, the workbook received the highest average rating of 4.17 (SD = 0.02), still within the High range. Two indicators - concepts attracting learners' attention and concepts being comprehensive and straightforward - received the highest individual mean scores of 4.21. This suggests that the key concepts were engaging and understandable for Grade 1 learners. Instructional clarity and comprehensibility can enhance learner motivation and engagement [39]. Similarly, concepts introduced in an accessible and straightforward manner can improve understanding and learner attitudes toward learning [40]. The lowest-rated indicators, with

a mean average of 4.12, concerned providing background information and arousing learners' interest, suggesting that some of the concepts could be made more engaging and accessible. Therefore, the key concepts were also reviewed and refined using more and simpler learner-friendly explanations.

The directions received an average mean of 4.33 ($SD = 0.01$), described as Very High. This indicates that the workbook instructions were clear, easy to follow, properly sequenced, and understandable enough for young learners to work independently. The teachers strongly agreed that the directions helped guide learners in accomplishing the activities. The lowest indicator was the ability of learners to accomplish the directions independently ($SD = 4.28$), that suggest a need for clearer instructions hence, the directions were reviewed and simplified to better support the independent learning of the students.

The activities received an average of 4.32 ($SD = 0.11$), also interpreted as Very High. The results suggest that the activities were relevant to the objectives and provided adequate support for developing learners' mathematical thinking and problem-solving skills. The activities were also considered appropriate to learners' abilities and mastery levels. Learners benefit from environments that promote active learning, problem-solving, and critical thinking [41]. Task quality is likewise important in inquiry-based learning and supports the value of engaging learning activities for young learners [42]. However, there are some indicators that received a lowest rating including the contextualization of activities ($SD = 1.02$), suggesting that some tasks could be more relatable to learners' experiences, thus the activities were reviewed to strengthen the learners' contextualization while maintaining the alignment with the intended competencies.

Table 5. Content Validity of the MATATAG Curriculum-Based Workbook in Numeracy for Grade 1

Content Validity	$\bar{x}$	SD
Topics	4.03	0.06
1. The topics are sequenced according to the MATATAG Curriculum.	4.05	0.89
2. The topics are carefully organized.	3.96	0.86
3. The topics are well-constructed.	4.02	0.83
4. The topics are logically arranged.	3.98	0.85
5. The topics are time-bounded.	4.14	0.71
Specific Objectives	4.14	0.03
1. The specific objectives are based on the target learning competencies.	4.12	0.68
2. The specific objectives are clearly stated and easily understood.	4.12	0.68
3. The specific objectives are measurable.	4.12	0.71
4. The specific objectives are attainable within the specified time limit.	4.19	0.64
5. The specific objectives are result-oriented.	4.16	0.62
Key Concepts	4.17	0.02
1. The key concepts give insights and ideas about what the activity is about.	4.18	0.66
2. The key concepts provide a background of concepts and information about the topic to be solved.	4.12	0.63
3. The key concepts arouse the learner's interest in solving the exercises.	4.12	0.63
4. The key concepts attract the learner's attention.	4.21	0.62
5. The key concepts are comprehensive and straightforward.	4.21	0.59
Directions	4.33	0.01
1. The directions are simple.	4.39	0.70
2. The directions are easy to follow.	4.35	0.69
3. The directions are properly sequenced.	4.32	0.71
4. The directions can be done independently.	4.28	0.73
5. The directions lead the learners to answer the activities.	4.32	0.71
Activities	4.32	0.11
1. The activities are relevant to the objectives.	4.35	0.67
2. The activities are adequate to develop learners' mathematical and scientific knowledge and skills.	4.33	0.69
3. The activities are adjusted to the learners' abilities.	4.33	0.72
4. The activities are sufficient to determine the learners' mastery level.	4.33	0.72
5. The activities provide opportunities for the development or enhancement of mathematical and higher-order thinking skills.	4.28	0.82
6. The activities arouse learners' interest, making learning effective and enjoyable.	4.35	0.77

7. The activities are contextualized.	4.25	1.02
Reflection	4.23	0.00
1. Learning experiences are expressed through reflection.	4.23	0.78
2. The reflection gives insights to the teacher if the learner needs remediation or enrichment.	4.26	0.77
3. The reflection guide questions help learners reflect on or examine their learning experience.	4.23	0.78
4. The reflection encourages learners to provide an in-depth analysis of the learning experience.	4.21	0.77
5. The reflection evaluates the relevance of the workbook.	4.23	0.78

The reflection component obtained an average mean of 4.23 (SD = 0.00), described as Very High. This indicates that the reflection section helps learners evaluate their own learning experiences and provides teachers with insights into whether learners need remediation or enrichment. The reflection guide questions help learners express their understanding and engage in deeper self-assessment. Reflection tools can promote learner independence and metacognitive awareness [43]. However, the lowest-rated indicator was the reflection that encourages learners to provide an in-depth analysis of the learning experience (SD= 0.77). This suggests that the reflection of the activities could provide greater opportunities for the learners to examine their own learning. Therefore, the reflection questions were reviewed and refined to encourage a deeper but age-appropriate reflection.

Overall, the workbook received consistently High to Very High ratings across all content validity components. The evaluators affirmed that the material was aligned with the MATATAG Curriculum, that the objectives were clear and measurable, that the key concepts were engaging and comprehensible, and that the activities and reflections meaningfully supported student learning even though there are some indicators that received lowest rating that was considered and also reviewed and refined to achieve the expectation and recommendation of the evaluators. These results suggest that the workbook is pedagogically sound and effectively designed to address the competencies expected of Grade 1 learners.

Table 6 presents the expert validation results for face validity, including language used, format and layout, and level of difficulty. The data show that the workbook was highly rated across all three areas, with each category receiving an average mean score above 4.40 and falling under the description Strongly Agree.

Table 6. Face Validity of the MATATAG Curriculum-Based Workbook on Numeracy for Grade 1

Face Validity	$\bar{x}$	SD
Language Used	4.45	0.03
1. The workbook uses formal language.	4.42	0.73
2. The workbook observes correct grammar.	4.44	0.68
3. The language is comprehensive in terms of vocabulary.	4.44	0.68
4. There is good clarity and ease of understanding in the language used.	4.47	0.66
5. There is sufficient familiar vocabulary to ensure learning.	4.47	0.63
6. The scientific terms used are comprehensibly defined.	4.44	0.68
Format and Layout	4.42	0.05
1. The workbook is clear and simple.	4.44	0.63
2. The workbook provides concrete visual clues.	4.44	0.63
3. To avoid duplication, the workbook is arranged logically.	4.37	0.75
4. It has a well-organized layout that makes the whole self-instructional material appealing and understandable.	4.39	0.70
5. There are appropriate structures, styles, and formats for the target audience.	4.39	0.73
6. The font size is readable enough for the learners.	4.46	0.73
7. The color scheme is appealing to the eye.	4.46	0.66
Level of Difficulty	4.44	0.06
1. Learning activities are designed to accommodate learners with varying attitudes and abilities.	4.44	0.68
2. There is a good fit between the activities and the subject matter.	4.44	0.68
3. The activities are engaging, relevant, and self-motivating to the learner.	4.47	0.63
4. The activities are contextualized so that learners can relate.	4.35	0.79
5. The activities are contextualized so that learners can relate.	4.47	0.60

For language use, the workbook obtained an average of 4.45 (SD = 0.03), indicating that the content used formal language, correct grammar, and vocabulary that was comprehensive and age-appropriate. Experts

agreed that the language was easy to understand and accessible to young learners. This finding suggests that the workbook communicates mathematical concepts in a way that supports comprehension and engagement. Learner engagement increases when texts use age-appropriate vocabulary and provide support for understanding unfamiliar words [44]. Vocabulary skills, including accurate usage and comprehension, also play a crucial role in improving comprehension among young learners [45]. Among the language related indicators, the use of formal language received the lowest rating with “The workbook uses formal language” obtaining a mean average of 4.42 (SD= 0.73). Although the rating remained within the range of Strongly Agree, it suggests that the language could be further checked for appropriateness and accessibility. The researchers therefore reviewed the wording and vocabulary used throughout the workbook to ensure that the language remained accurate, familiar, and understandable for Grade 1 learners.

The format and layout of the workbook were positively evaluated, with an average score of 4.42 (SD = 0.05). Evaluators noted the clarity, organization, and visual appeal of the material. Visual cues and the logical arrangement of content support the workbook's user-friendliness and instructional soundness. Readable font size and appealing color schemes further support suitability for Grade 1 learners. Typographical features such as font choice and spacing can improve reading speed and reduce cognitive load among children, particularly those with visual difficulties [46]. Clear visual design and illustrations can also enhance attention, memory, and interest among young learners in primary textbook materials [47]. The item related to logical arrangement to avoid duplication obtained the comparatively lower score of the mean average 4.37 (SD= 0.75). This results, although still within the Strongly Agree range, suggests that minor improvements could still be made to its organization and presentation of the workbook. Thus, arranging the activities and sections was reviewed to improve the logical flow of the material and to minimize the unnecessary repetition.

For level of difficulty, the workbook achieved an average mean of 4.44 (SD = 0.06), indicating strong agreement that the exercises were appropriate and varied in complexity. The activities were designed to accommodate learners with different abilities and to increase progressively from Level 1 to Level 3 [48]. This progressive structure can reinforce prior learning and challenge learners as they gain confidence [49]. The results indicate that the workbook meets high standards of design and instructional value. The inclusion of relatable, contextualized tasks and emotionally reflective components, such as coloring activities that allow learners to express their feelings, adds a student-centered element to the learning process. Contextualized learning materials can enhance cognitive understanding and learner motivation [50]. Continued refinement based on learner feedback and classroom implementation can further improve the workbook's effectiveness. Related to the other indicators in this component, the statement “The activities are contextualized so that the learners can relate” received the lowest mean average of 4.35 (SD= 0.79). Despite receiving a Strongly Agree rating, this suggests that some of the activities could still be made more relatable while maintaining their intended level of difficulty. The researchers reviewed and enhanced the activities by incorporating familiar contexts that are appropriate for Grade 1 learners while also retaining the progressive structure and intended difficulty of the workbook.

The overall face validity results show that the workbook received highly consistent evaluations in language use, format and layout, and level of difficulty. This indicates that the material is clear, visually appealing, and pedagogically structured for the developmental level of Grade 1 learners. These findings also show that the workbook balances language clarity, content organization, and task appropriateness, making it both user-friendly and instructionally useful. The results confirm that the workbook meets the expected quality standards for supplementary learning materials under the MATATAG Curriculum.

4. CONCLUSION

This study developed a MATATAG Curriculum-aligned mathematics workbook for Grade 1 learners. Grade 1 teachers helped identify the most difficult numeracy competencies, particularly those involving problem-solving and number operations. Based on the results, the five most difficult first-quarter competencies and the five most difficult second-quarter competencies were used as the basis for the workbook content. The workbook integrated storytelling, real-life examples, leveled activities, and reflective components such as journaling and story summaries to accommodate learners' varied styles and needs. The primary contribution of this study is the development of a curriculum-based instructional material that are grounded in teacher-identified numeracy difficulties.

The validation results showed consistently high mean scores across the evaluated areas. These findings confirm that the developed workbook is adequate, relevant, and developmentally appropriate as supplementary learning material for strengthening Grade 1 numeracy skills. The findings further establish the workbook as the validated supplementary resource that responds to a specific numeracy that needs identified within the local school context. Given its positive evaluation and alignment with curriculum standards, the workbook has strong potential for practical classroom implementation and can provide teachers with a reliable instructional material for improving numeracy teaching and learning.

In light of the findings, Grade 1 teachers may undergo seminars and training on how to use the workbook in daily instruction, particularly through storytelling, problem-solving, and the Concrete-Representational-Abstract (CRA) model. Teachers may also guide learners through step-by-step procedures for completing the workbook. School administrators may include the proposed workbook among classroom learning materials, consider printing additional copies, and include its use in the School Improvement Plan (SIP), especially in schools with limited learning resources. Parents and guardians are encouraged to use the workbook at home to reinforce children's learning because the workbook contains clear directions and structured activities. Educational development planners may also consider the workbook outcomes when planning future teacher seminars, training programs, or curriculum learning materials. Collaboration among teachers, parents, school administrators, and curriculum planners can support a more conducive learning environment and improve both basic numeracy skills and mathematics readiness among Grade 1 learners. At the given policy level, DepEd and the local education authorities may use the study as a reference for developing localized instructional material based on the identified competency gaps by the teachers and evaluators. The continued evaluation of the workbook after the classroom implementation is also highly recommended to determine the effectiveness and guide further refinement.

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