**DEVELOPMENT AND VALIDATION OF LOCALLY SOURCED MATH MANIPULATIVES FOR GRADES 1 AND 2 PUPILS**

**ABSTRACT**

**Purpose**:

This study aimed to develop and validate culturally relevant math manipulatives using locally sourced materials for Grade 1 and 2 learners in Balasi Elementary School, Flora District, Apayao, Philippines. The research addressed the lack of culturally appropriate and cost-effective math manipulatives in the school. The study employed the Research and Development (R&D) model of Borg and Gall to develop five entirely new manipulatives: "Hold Me! Click Clock" for telling time, "Make Three, Make Two" for multiplication as repeated addition, "What's Missing? Fill Me" for pattern recognition, and "Toss and Fill In" for addition and subtraction. These manipulatives were not adaptations of existing materials. The manipulatives were evaluated using the DepEd’s evaluation-rating sheet and a face validation tool. All manipulatives passed the evaluation criteria, demonstrating their validity and effectiveness for teaching the targeted math concepts. The study highlights the potential of using local materials in developing teaching resources to enhance learning, promote inclusivity, and support environmental sustainability

**Methods**

The researcher used the research and development (R&D) model of Borg and Gall, which involved five phases: identifying learning competencies in Mathematics 1 and 2 where math manipulatives can be integrated, developing math manipulatives appropriate for the identified topics using local materials, evaluating the manipulatives using the DepEd’s face validation tool and the evaluation-rating sheet, incorporating comments and suggestions from the validation process, and finalizing the instructional materials.

**Result**

This study was conducted to develop and validate math manipulatives as instructional materials in teaching specific topics in Math 1 and 2. The researcher made use of the Research and Development model as a method of research with the following phases: Identification of learning competencies where math manipulatives can be integrated, development of the math manipulatives and validation of the IMs using face validation tool developed by the DepEd. Learning Resources Management and Development System. The developed IMs was evaluated by the School Learning Resources Management and Development Committee of Balasi Elementary School of Flora district. From the data gathered, the research yielded the following findings: math manipulatives can be used in teaching telling time, multiplication as repeated addition, missing patterns, and addition and subtraction. The developed math manipulatives passed the criteria for evaluating IMs set by the LRMDS.

**Conclusions**:

There are five learning competencies where math manipulatives can be integrated into telling and writing time, illustrating multiplication as repeated addition, determining the missing terms in each continuous pattern, illustrating addition as putting together or combining sets, and subtraction as taking away or comparing elements of sets. All the math manipulatives are rated valid and passed the criteria set by the School Learning Resources Management and Development System. The study concluded that the use of locally sourced materials in developing math manipulatives is an effective way to enhance learning, promote inclusivity, and support environmental sustainability. The developed manipulatives were found to be valid and effective for teaching the targeted math concepts. However, further research is needed to assess the manipulatives' impact on student learning.

**KEYWORDS**

*Math Manipulative Materials, Learning Resources Management and Development System, Evaluation Tool, Indigenized, Local materials, Math Learning Competencies.*

**1. INTRODUCTION**

The Department of Education (DepEd) supports the right of indigenous people to a relevant and responsive basic education related to their context, beliefs, practices, skills, and identities that helps them to promote and value their indigenous knowledge. The utilization of indigenous/indigenized instructional materials would help teachers to motivate learners to be more interested in Mathematics. This material will play a vital role in pupils’ participation. It will widen teachers’ imagination and creativity, and it can make teaching and learning math easier and less stressful.

Piaget (1952) suggested that “youngster’ and adults’ thoughts, language, and actions differ in both quantity and quality”. According to Piaget (1971), “learners move through four stages of intellectual development (sensorimotor, preoperational, concrete operations, and formal operations) and learning involves either add new information to existing psychological frameworks (assimilation) or developing or evolving new cognitive structures (accommodation). Piaget hypothesized that children were not mentally mature enough to grasp abstract mathematical concepts if their teachers only presented the concepts in writing (using words, numbers and symbols). According to Piaget, children need several experiences with concrete materials and drawings to learn abstract concepts. Piaget believed that as children mature to their adolescence their need for concrete experiences diminishes but never ceases”.

Indeed, through utilization of indigenous instructional materials, we could help our community to manage waste, lessen environmental pollution and preserve the good values and principles that are good and can be adapted and passed from generation to generation. Indigenous Instructional Materials can make mathematics more enjoyable and fun for our IP pupils. Using them can form a focal point, attract attention, arouse interest and promote a desire to learn. It can also build pupil’s confidence to be engage with the materials and even make them repeat the activity during their free time since they are expose to all kinds of existing indigenous material. Moreover, it provides opportunity to parents to be involve in their children’s school life. It unburdens them to buy materials from the market for their children’s assignment and project in school.

This study focuses on the development and validation of culturally relevant math manipulatives using locally sourced materials for Grade 1 and 2 students in Balasi Elementary School, Flora District, Apayao, Philippines. The research employed the Research and Development (R&D) model of Borg and Gall to develop five manipulatives: “Hold Me! Click Clock” for telling time, “Make Three, Make Two” for multiplication as repeated addition, “What's Missing? Fill Me” for pattern recognition, and “Toss and Fill In” for addition and subtraction. The manipulatives were evaluated using the DepEd’s evaluation-rating sheet and a face validation tool. All manipulatives passed the evaluation criteria, demonstrating their validity and effectiveness for teaching the targeted math concepts. The study highlights the potential of using local materials in developing teaching resources to enhance learning, promote inclusivity, and support environmental sustainability.

**2. LITERATURE REVIEW AND RESEARCH METHODS**

**2.1. Study Design**

The researcher employed the research and development (R&D) model of Borg and Gall, which involves five phases:

* Phase I: Identifying learning competencies in Mathematics 1 and 2 where math manipulatives can be integrated.
* Phase II: Selecting the existing developed math manipulatives appropriate for the identified topics.
* Phase III: Evaluating the manipulatives using the DepEd’s face validation tool and the evaluation-rating sheet.
* Phase IV: Incorporating comments and suggestions from the validation process.
* Phase V: Finalizing the instructional materials.

**2.2. Participants**

The study involved Grade 1 and 2 students at Balasi Elementary School, Flora District, with an enrollment of 5 pupils (2 males and 3 females) in Grade 1 and 8 pupils (4 males and 4 females) in Grade 2. The students participated in the pilot testing phase of the manipulative development, providing feedback on the design and usability of the materials. The School Learning Resources Management and Development System (LRMDS) evaluation team, consisting of the school head and three committee members, also participated in the study.

**2.3. Instrumentation**

The study utilized the following instruments:

* The DepEd’s evaluation-rating sheet was used to assess the content quality, other findings, and additional requirements for the manipulatives. It consists of three factors:
  + Factor A: Content Quality (rated on a 4-point scale: Very Satisfactory, Satisfactory, Poor, Not Satisfactory)
  + Factor B: Other Findings (rated on a 4-point scale: Not Present, Present but very minor and must be fixed, Present and requires major development, Poor, do not evaluate further)
  + Factor C: Additional Requirements for Manipulatives (rated on a 4-point scale: Very Satisfactory, Satisfactory, Poor, Not Satisfactory)
* A face validation tool was designed to evaluate the manipulatives based on the following criteria: materials used, rules, questions, and the manipulatives themselves. A 4-point scale was used for rating (Highly Valid, Valid, Not Valid, Strongly Not Valid).

**2.4. Data Collection Procedure**

Data was collected over a period of two months, involving the following steps:

* Identifying topics and learning competencies in Mathematics 1 and 2 where math manipulatives can be used.
* Selecting existing mathematics manipulatives for the identified topics.
* Evaluating the math manipulatives using the evaluation-rating sheet and the face validation tool by the School LRMDS Committee.
* Gathering data using a face validation tool to determine the respondents’ feedback regarding the manipulative materials after exposure.
* Calculating the weighted mean and grand mean for general interpretation of the responses.

**2.5. Data Analysis**

The researcher used a 4-point scale to describe the validity of the manipulative material, eliminating the "undecided" category. The list below shows the limits of description and verbal description for the different factors used in the validation of the study:

List 1: the limits of description and verbal description for the different factors used in the validation of the study

|  |  |  |
| --- | --- | --- |
| **Scale** | **Limits of Description** | **Verbal Validity** |
| 4 | 3.40 – 4.19 | Highly Valid |
| 3 | 2.60 – 3.39 | Valid |
| 2 | 1.80 – 2.59 | Not Valid |
| 1 | 1.00 – 1.79 | Strongly Not Valid |

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**3. Results and Discussion**

This section presents the developed manipulative instructional materials and a detailed discussion of the findings.

**3.1. Development of the Math Manipulatives**

* The initial step was to identify specific learning competencies within Mathematics 1 and 2 where math manipulatives could be effectively integrated. This involved a thorough review of the curriculum guidelines and the identification of key areas where hands-on learning could enhance understanding. The researcher focused on the following key areas:
  + **Telling and Writing Time:** This involved using manipulatives to teach students how to tell and write time using both analog and digital clocks (M2ME-IVa-5, M1ME-IVb-3).
  + **Multiplication as Repeated Addition:** The goal was to create manipulatives that would help students understand multiplication as repeated addition, using groups of equal quantities (M2NS-IIf-38).
  + **Pattern Recognition:** The manipulatives were designed to help students identify missing terms in continuous and repeating patterns using various attributes like letters, numbers, colors, figures, and sizes (M1AL-IIIg-1, M1AL-IIIg-2).
  + **Addition and Subtraction:** The manipulatives aimed to teach students how to illustrate addition as "putting together" or "combining sets" and subtraction as "taking away" or "comparing elements of sets" (M1NS-IIa-23, M1NS-IIf-24).
* **Selection of Locally Sourced Materials:** The researcher emphasized the use of culturally relevant and locally sourced materials to ensure both cost-effectiveness and engagement with the community's resources. The selection process involved brainstorming, consultation with local artisans, and a careful evaluation of the materials' suitability for creating the manipulatives. Some of the materials used included:
  + **Circular Wood:** This was used for creating clock faces and other shapes. The wood was sourced from local carpenters and was chosen for its durability and ease of carving.
  + **Cut Plastic:** This was used for creating various shapes and pieces for the manipulatives. The plastic was sourced from recycled materials, promoting environmental sustainability.
  + **Hand-woven Baskets:** These were used as containers for holding objects and for organizing the manipulatives. The baskets were sourced from local weavers, showcasing the community's traditional crafts.
  + **Corn Cobs:** These were used for counting and for creating patterns. The corn cobs were sourced from local farmers, highlighting the importance of agriculture in the community.
  + **Bamboo Sticks:** These were used for creating visual representations of numbers and for measuring. The bamboo sticks were sourced from local forests, promoting the use of sustainable resources.
  + **Coconut Shells:** These were used for counting and for creating game pieces. The coconut shells were sourced from local coconut farmers, showcasing the community's agricultural practices.
  + **Bamboo Tubs:** These were used as containers for holding objects and for organizing the manipulatives. The bamboo tubs were sourced from local artisans, promoting the use of traditional crafts.
  + **Wooden Dice:** These were used for generating random numbers and for playing games. The wooden dice were sourced from local carpenters, showcasing the community's woodworking skills.
* **Design and Development Process:** The researcher developed five manipulatives, each designed to address a specific learning competency:
  + **"Hold Me! Click Clock":** This manipulative was designed to teach students how to tell and write time using analog and digital clocks. It consisted of a wooden clock face, wooden dice for representing hours and minutes, and a card with instructions. The design was based on existing clock manipulatives, but it was adapted to incorporate the locally sourced materials.
  + **"Make Three, Make Two":** This manipulative was designed to teach students how to understand multiplication as repeated addition. It consisted of bamboo tubes, objects like corn cobs or coconut shells, and flash cards with multiplication sentences. The design was based on the concept of grouping objects to represent multiplication, but it was adapted to use the available materials.
  + **"What's Missing? Fill Me":** This manipulative was designed to help students identify missing terms in patterns. It consisted of baskets or bamboo tubes, objects like corn cobs or coconut shells, and cards with patterns. The design was based on the concept of pattern recognition, but it was adapted to use the available materials.
  + **"Toss and Fill In":** This manipulative was designed to teach students how to illustrate addition and subtraction. It consisted of coconut shells, wooden dice, and symbols for addition and subtraction. The design was based on the concept of using objects to represent numbers and symbols, but it was adapted to use the available materials.

**3.2 Math Manipulatives name and how to use it.**

•**Hold me! Click Clock**

Let a pupil toss the dice for hour hand and two dice for the minute hand. Let the pupil arrange the dice to look like an analog clock with the card as guide then let her/him manipulate the wood clock to show the time. If the answer is correct, the children will clap their hands. If ever her/his answer is wrong, then allow another pupil to help her/him.

**•Make Three, Make Two**

Let them pick a flash card in the basket, let them show the written multiplication sentence in repeated addition using the math manipulatives. For example, 3x4 I have three groups with four in each group. Put four objects in each group. After putting four objects in each group, count all of them to figure out the total by adding each object in each group.

•**What’s missing? Fill me.**

Place five or more familiar numbers/ letters on the bamboo or basket and have the sit or stand around it. Discuss the numbers then ask them to close their eyes while you remove one or two of the numbers/letters. When they open their eyes, have the children take turns trying to guess which of the numbers/ letters are missing. After a correct answer is given, mix up the positions of the numbers or letters and the game start again.

•**Toss and fill in**

This is Pair activity. They must toss first the symbol (addition and subtraction). Then toss the dice for the addends then put in line with the coconut shells then count the number of shells to be put inside it. Same with the other player. After that, both players will count all the shells to figure out the total number.

* 1. **Pilot Testing and Refinement**

 Each manipulative underwent a pilot testing phase with students in the target grade levels. This phase aimed to refine the design and ensure user-friendliness. Feedback from the pilot testing was used to adjust the manipulatives, ensuring their effectiveness in teaching the intended math concepts.

* 1. **Learner and Expert Feedback**
* General Feedback

The manipulatives were well-received by the Grade 1 and 2 learners who participated in the pilot testing phase. They found the materials engaging and helpful for learning math concepts. The learners enjoyed learning by doing and easily learned the target competencies. They commented that these materials are recommended for usage by teachers and learners even in higher grades to make the teaching-learning process more meaningful.

* Feedback on specific manipulatives
* The validation report indicates that the "Hold Me! Click Clock" manipulative was engaging for learners and that they enjoyed using it. The report also suggests that the manipulatives' use of locally sourced materials made learning more relevant and enjoyable for the students, and that the manipulative could be used effectively outside of the classroom setting.
* The bamboo tubes and objects made it easy to understand multiplication as repeated addition."
* The students really liked figuring out the missing numbers or letters in the patterns.
* The coconut shells and dice made addition and subtraction fun.
* Learners Shared General Comments
* "I liked that we could use things from our own community to learn math."
* "The manipulatives made math more interesting and easier to understand."
* "I learned a lot using these manipulatives, and I want to use them again."

**3.5. Validation Results**

The selected manipulatives were evaluated using the DepEd’s evaluation-rating sheet and a face validation tool. The results are presented in Tables 1-5.

**Table 1: Experts Validation Rating of Hold Me! Click Clock Using the Different Factors**

|  |  |  |
| --- | --- | --- |
| **FACTORS** | **Mean** | **Verbal Description** |
| A. Content | 3.82 | Valid |
| B. Other Findings | 3.85 | Valid |
| C. Additional Requirements for Manipulatives | 3.8 | Valid |
| Overall Mean | 3.82 | Valid |

**Table 2: Experts Validation Rating of Make Two, Make Three Using the Different Factors**

|  |  |  |
| --- | --- | --- |
| **FACTORS** | **Mean** | **Verbal Description** |
| A. Content | 3.89 | Valid |
| B. Other Findings | 4 | Highly Valid |
| C. Additional Requirements for Manipulatives | 3.65 | Valid |
| Overall Mean | 3.84 | Valid |

**Table 3: Experts Validation Rating of What’s Missing? Fill Me Using the Different Factors**

|  |  |  |
| --- | --- | --- |
| **FACTORS** | **Mean** | **Verbal Description** |
| A. Content | 3.82 | Valid |
| B. Other Findings | 3.4 | Valid |
| C. Additional Requirements for Manipulatives | 4 | Highly Valid |
| Overall Mean | 3.74 | Valid |

**Table 4: Experts Validation Rating of Toss and Fill In Using the Different Factors**

|  |  |  |
| --- | --- | --- |
| **FACTORS** | **Mean** | **Verbal Description** |
| A. Content | 3.55 | Valid |
| B. Other Findings | 3.4 | Valid |
| C. Additional Requirements for Manipulatives | 3.73 | Valid |
| Overall Mean | 3.56 | Valid |

The validation results indicate that all the selected math manipulatives passed the criteria set by the School Learning Resources Management and Development System (LRMDS). They are recommended for further evaluation and use by Grade 1 and 2 teachers and learners of Balasi Elementary School.

**Table 5:** **Topics and learning competencies where a math manipulative can be used**

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Competencies** | **Topic** | **Math Manipulatives** | **Picture** |
| Tells and writes time in minutes including a.m. and p.m. using analog and digital clocks.  **M2ME-IVa-5**  Tells and writes time by hour, half-hour and quarter-hour using analog clock.  **M1ME-IVb-3** | Telling and Writing Time | Hold me!  Click Clock | C:\Users\DepED\Desktop\RPMS 2019\IMG20190318145725.jpg |
| Illustrates multiplication as repeated addition using  **32.1 groups of equal quantities**  **M2NS-IIf-38** | Multiplication as repeated addition | Make Three, Make Two | C:\Users\DepED\Desktop\RPMS 2019\IMG20190427074518.jpgC:\Users\DepED\Desktop\RPMS 2019\IMG20190427074837.jpg |
| Determines the missing term/s in a given continuous pattern using one attribute (letters/ numbers/events).  e.g.  A,B,C,D,\_\_  2,3,\_\_5,6,7  \_\_,Wed, Thur, Fri  Aa, Bb, Cb, \_\_,\_  **M1AL-IIIg-1**  Determines the missing term/s in a given repeating pattern using one attribute (letters, numbers, colors, figures, sizes, etc.).  e.g.  A,B,C,A,B,C,A,  **M1AL-IIIg-2** \_\_ | Patterns | What’s Missing?  Fill me. | C:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190319164750.jpgC:\Users\DepED\Pictures\Saved Pictures\IMG20190319162136 (2).jpgC:\Users\DepED\Desktop\RPMS 2019\IMG20190319162503.jpg |
| Illustrates addition as “putting together or combining or joining sets”  **M1NS-IIa-23**  Illustrates subtraction as “taking away” or “comparing” elements of sets.  **M1NS-IIf-24** | Addition and Subtraction | Toss and Fill In | C:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190320155319.jpgC:\Users\DepED\Desktop\RPMS 2019\New folder\IMG20190320152635.jpg |

**4. Conclusion**

This study successfully validated the effectiveness of existing math manipulatives using local materials for multigrade 1 and 2 students in Balasi Elementary School, Flora District, Apayao. The selected manipulatives were found to be effective in teaching telling time, multiplication as repeated addition, pattern recognition, and addition and subtraction. The study highlights the potential of using locally sourced materials in developing teaching resources to enhance learning, promote inclusivity, and support environmental sustainability for Grades 1 and 2 pupils.

**5.Ensuring Student Safety and Well-being**

We recognized that ensuring the safety and well-being of the students was paramount throughout this study. We took a few steps to create a positive and supportive learning environment where students could engage in the manipulative activities with confidence.

* **Physical Safety:** We carefully selected and prepared the manipulative materials, ensuring that they were free of sharp edges, small parts, and other hazards. We also reinforced materials like the cardboard used in "What's Missing? Fill Me" to ensure durability. During the activities, a teacher or adult was always present to monitor the students and ensure their safety. For example, when using the 'Toss and Fill In' activity, we ensured that the students were throwing the dice and counting the coconut shells in a safe and controlled manner.
* **Emotional Well-being:** We used positive reinforcement to encourage all students to participate and to help them feel successful. We also provided individualized support to students who needed it, working with them one-on-one or in small groups to help them understand the manipulatives and the math concepts. We encouraged students to take a break if they needed a moment to relax and refocus. We also had alternative activities available for students who were struggling or who were finished with the manipulatives.
* **Academic Disadvantage:** We used differentiated instruction to meet the needs of all students, providing extra support to students who were struggling and challenging students who were ahead. We assessed students' understanding of the math concepts before and after using the manipulatives to identify any learning gaps and

**6. Ethical Approval and consent**

This study was approved by the Institutional Review Board (IRB) of the Graduate School. Prior to data collection, all participants (teachers and students) provided written informed consent. Participants were informed of their right to withdraw from the study at any time without penalty.

To ensure confidentiality, all participant data was anonymized before analysis. Participant names and identifying information were not included in any reports or publications.

The manipulatives used in this study were carefully selected and prepared to ensure the physical safety of all participants. The materials were free of sharp edges, small parts, and other hazards. During the activities, a teacher or adult was always present to monitor the students and ensure their safety.

The data collected from this study will be stored securely for a period of five years. After this time, the data will be destroyed.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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**Appendix A**

**Summary of Evaluation of Math Manipulatives**

**Title:** Hold me! Click Clock

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 3 | 3 | 4 | 3.3 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 3 | 4 | 4 | 3.6 |
| 6. Visuals are suitable to the age level and interests of the target user. | 3 | 4 | 3 | 3.3 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 4 | 4 | 4 | 4 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 43 | 43 | 38.2 |
| Mean 3.82 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 3 | 4 | 3 | 3.3 |
| 3. Grammatical and/or typographical errors. | 4 | 4 | 4 | 4 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 15 | 16 | 15 | 15.3 |
| Mean 3.825 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 3 | 4 | 3 | 3.3 |
| 2. Activities are summarised; extension activities are provided. | 4 | 4 | 4 | 4 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 4 | 4 | 4 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 23 | 24 | 23 | 23.3 |
| Mean 3.8 | | | | |
| Total Mean 3.815 | | | | |
| Other Comments | | | | |
| The marking on the clock should be painted so that it will be visible and not easily be erased. | | | | |
| Recommendation | | | | |
| Using this manipulative clock, it make learning enjoyable and lasting because of the engagement of learners to the materials which is available in the community. So, it is recommended for the learners to use this material even in outside the classroom. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** Make Two, Make Three

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 3 | 4 | 4 | 3.6 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 4 | 4 | 4 | 4 |
| 6. Visuals are suitable to the age level and interests of the target user. | 3 | 3 | 4 | 3.3 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 4 | 4 | 4 | 4 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 36 | 37 | 40 | 38.9 |
| Mean 3.89 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 4 | 4 | 4 | 4 |
| 3. Grammatical and/or typographical errors. | 4 | 4 | 4 | 4 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 16 | 16 | 16 | 16 |
| Mean 4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 3 | 4 | 3 | 3.3 |
| 2. Activities are summarised; extension activities are provided. | 3 | 3 | 4 | 3.3 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 3 | 4 | 3 | 3.3 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 21 | 23 | 22 | 21.9 |
| Mean 3.65 | | | | |
| Total Mean 3.84 | | | | |
| Other Comments | | | | |
|  | | | | |
| Recommendation | | | | |
| With these bamboo tubes and, the learners enjoyed learning by doing and easily learned the target competencies. As per observation, these materials are recommended for usage by teachers and learners even in higher grades to make the teaching learning process more meaningful. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** What’s missing? Fill me

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 3 | 3 | 4 | 3.3 |
| 3. Facts are accurate. | 4 | 4 | 4 | 4 |
| 4. Information provided is up-to-date. | 4 | 4 | 4 | 4 |
| 5. Visuals are relevant to the text. | 3 | 4 | 4 | 3.6 |
| 6. Visuals are suitable to the age level and interests of the target user. | 4 | 4 | 4 | 4 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 3 | 3 | 4 | 3.3 |
| 9. Size of the material is appropriate for use in school. | 4 | 4 | 4 | 4 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 38 | 40 | 38.2 |
| Mean 3.82 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 4 | 4 | 4 | 4 |
| 2. Factual errors. | 3 | 3 | 3 | 3 |
| 3. Grammatical and/or typographical errors. | 4 | 3 | 4 | 3.3 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 3 | 4 | 3.3 |
| **TOTAL POINTS** | 15 | 13 | 15 | 13.6 |
| Mean 3.4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 4 | 4 | 4 | 4 |
| 2. Activities are summarised; extension activities are provided. | 4 | 4 | 4 | 4 |
| 3. Suggested activities support innovative pedagogy. | 4 | 4 | 4 | 4 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 4 | 4 | 4 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 16 | 16 | 16 | 16 |
| Mean 4 | | | | |
| Total Mean 3.74 | | | | |
| Other Comments | | | | |
| These materials are culturally relevant since it depicts the common livelihood of the Agta people which is weaving and the materials are easy to handle. | | | | |
| Recommendation | | | | |
| The baskets are attractive and useful however the cardboard should be laminated to be more durable for future use. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

**Summary of Evaluation of Math Manipulatives**

**Title:** Toss and fill in

**Type:** Manipulative

**Intended for:** Grade 1 and 2

**Subject Area:** Mathematics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FACTOR A:** Content | Evaluator | Evaluator | Evaluator | Average |
| 1. Content reinforces, enriches, and/or leads to the mastery of certain learning competencies for the level and subject it was intended | 4 | 4 | 4 | 4 |
| 2. Material has the potential to arouse interest of the target users. | 4 | 4 | 4 | 4 |
| 3. Facts are accurate. | 4 | 4 | 4 | 4 |
| 4. Information provided is up-to-date. | 3 | 3 | 4 | 3.3 |
| 5. Visuals are relevant to the text. | 4 | 4 | 4 | 4 |
| 6. Visuals are suitable to the age level and interests of the target user. | 4 | 4 | 4 | 4 |
| 7. Visuals are clear and adequately convey the message of the subject or topic. | 4 | 4 | 4 | 4 |
| 8. Typographic layout/ design facilities understanding of concepts presented. | 3 | 3 | 3 | 3 |
| 9. Size of the material is appropriate for use in school. | 3 | 3 | 3 | 3 |
| 10. Material is easy to use and durable. | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 37 | 37 | 38 | 37.3 |
| Mean 3.73 | | | | |
| Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| **Factor B. Other Findings**  Note down observations about the information contained in the material, citing specific pages where the following errors are found: | Evaluator | Evaluator | Evaluator | Average |
| 1. Conceptual errors. | 3 | 3 | 3 | 3 |
| 2. Factual errors. | 4 | 4 | 3 | 3.6 |
| 3. Grammatical and/or typographical errors. | 3 | 3 | 3 | 3 |
| 4. Other errors(i.e., computational errors, obsolete information, errors in the visuals, etc.) | 4 | 4 | 4 | 4 |
| **TOTAL POINTS** | 14 | 14 | 13 | 13.6 |
| Mean 3.4 | | | | |
| Note: Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box | | | | |
| Factor C. Additional Requirements for Manipulative  Instructional Design | Evaluator | Evaluator | Evaluator | Average |
| 1. Adequate support material is provided. | 4 | 4 | 4 | 4 |
| 2. Activities are summarised; extension activities are provided. | 3 | 3 | 3 | 3 |
| 3. Suggested activities support innovative pedagogy. | 3 | 3 | 3 | 3 |
| Technical Design | | | | |
| 4. Manipulative is safe to use. | 4 | 4 | 4 | 4 |
| 5. Size and composition of manipulative is appropriate for intended audience. | 4 | 3 | 3 | 3.3 |
| 6. Suggested manual tasks within the activities are compatible with the motor skills of the intended users. | 4 | 4 | 4 | 4 |
| TOTAL POINTS | 22 | 21 | 21 | 21.3 |
| Mean 3.55 | | | | |
| Total Mean | | | | |
| Other Comments | | | | |
| The materials enhances the development of desired behavior such as appreciation and utilization of local products as learning materials and it helps both the learner and the teacher to make the learning relevant and easy since it is readily available in the community. | | | | |
| Recommendation | | | | |
| It is therefore recommended to use these materials in all grade levels in teaching the four basic operations since it is designed for learner’s manipulation. | | | | |
| Note: Any material that fails Factor B must not be recommended for use in public schools until the identified issues have been fixed. | | | | |
| (Please tick the appropriate box) | | | | |
| i. | I/We recommend the approval of this material for possible use in public schools provided thatic the corrections/ revisions included in this report are made. (For commercial resources (non-DepED owned resources) the Publisher must implement all recommended corrections/ revisions in their next printing or provide errata.) | | | |
| ii. | I/We do not recommend the approval of this material for possible use in public schools for the reasons stated below and/or cited in this evaluation report. (Please use separate sheet if necessary.) | | | |

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**LEARNERS MANIPULATINGN THE DEVELOPED MATERIALS**

